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Eat and Be Healthy

THE DIET QUESTION SIMPLIFIED



By Dr. VIRGIL MAC MICKLE

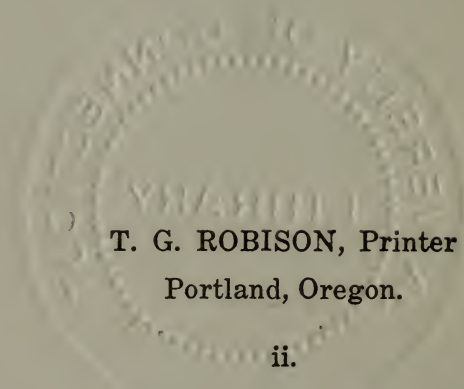


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FOREWORD.

The purpose of this book is to lay bare to the everyday reader, the basic facts of human nutrition in understandable English, and to present the general conclusions drawn from these underlying facts and from wide experience in the dietetic treatment of disease as briefly as possible and yet as fully as necessary to give the reader a thoro grasp of the problem of diet in health and disease. The questions asked by many patients and numerous attendants of lectures given by the author have been constantly borne in mind to the end that this book might tell the average reader just what he wants to know—the What, How, When, and Why of eating for health. No attempt has been made to cover the entire field of human nutrition in all its ramifications—to do so would take a library in itself and be so expensive of time, patience, energy and money that no one would read it, but the author has tried to give the reader a general view of the problems of human nutrition and specific rules for his guidance in healthfully feeding himself and his family, with an explanation of every rule laid down, and an exposition of the facts upon which it is based. The author will be well repaid if he succeeds in introducing the reader to the subject of dietetics, acquainting him with its language, and awakening within him the desire to pursue the subject further. For, after all, wrong feeding is the main factor in the causation of most disease and a contributing factor in practically all, and if the terrible grist of human suffering could be shut off at its source it would be so much simpler, so much easier, so much more economical of human life and misery, and so much more satisfactory in every way than the sorry business of treating merely a few of the hosts made sick by this one cause.

Treating people for the bad results of wrong eating when their misery could be prevented by correct eating is so much like swatting a few flies while the rubbish heap which is their breeding ground remains neglected that it would seem ridiculous if it weren't so pitiful. It is hoped that the present humble volume will help clean up the breeding cause of at least some of this disease. And if the reader wishes to pursue the study of the subject further he is recommended to study carefully some of the many works referred to in the present volume, works of which the author has made full use in getting out this little book.

The author wishes to make grateful acknowledgment to Mrs. MacMickle for her invaluable practical criticism of the book's contents and to Mr. H. C. Dekker for his generous assistance in editing and revising the manuscript.—V. MacMickle, Portland, Oregon.

EAT AND BE HEALTHY.

CHAPTER I.

Introductory.

The diet question, when viewed in the light of present day knowledge of the chemistry of foods and the physiology and chemistry of nutrition, is exceedingly simple. However, without this knowledge of the chemistry of foods and the processes of nutrition, it seems an exceedingly chaotic question. I do not mean that we must know all about these things, tho it would be of great gain if we did; but with the rules based on this knowledge we must be acquainted, if we are to avoid sickness, premature old age and premature death. Therefore, since it is the rules and the following of them that is of the most importance to us, for the benefit of those who merely want to know how to eat properly in order that they may attain health and prolonged life, and who are willing to take these rules on faith, I shall give the rules first.

For those who want to know the WHY of the rules, I shall follow the rules with a discussion of the chemistry of foods and the chemistry and physiology of nutrition in as simple and non-technical language as is consistent with accuracy. All who take the trouble of learning the reasons underlying the rules will never forget the rules themselves and will never have any doubt as to why they are following any given rule. No amount of conflicting dietetic claims need ever disturb them, for I shall not give a single rule that is not founded upon scientific facts, and I shall quote men of national and international standing in the domain of physiology and allied branches as authorities for the facts I give.

Bear in mind that the following rules are not pretty pet theories, but have been arrived at, only after considerable personal experience and observation; and, moreover, the study of world-famed authorities has proved them to be correct. You have to take neither my own statements nor those of anyone else; just follow these rules consistently and conscientiously for awhile and you will prove to your entire satisfaction that they are right. Of course, there are special conditions in which general rules, such as these needs must be, cannot be relied upon entirely, and in these cases your safest course lies in consulting an expert dietitian. No general rule was ever made that covered each particular case.

CHAPTER II.

Composition of the Body and of Foods.

Before formulating the rules of correct eating let us start with some facts that are, or should be, common knowledge.

First, our bodies are aggregates of chemical compounds, made up of about fifteen or sixteen different chemical elements, the principal ones of which, together with the percentage of each, are as follows:

	Per cent		Per cent
Oxygen, about	65.00	Carbon, about	18.00
Hydrogen, about	10.00	Nitrogen, about	3.00
Calcium, about	2.00	Phosphorus, about	1.00
Potassium, about	0.35	Sulphur, about	0.25
Sodium, about	0.15	Chlorine, about	0.15
Magnesium, about	0.05	Iron, about	0.004

Iodine, fluorine and silicon are also found in very minute quantities. Of course, these elements make up a great number of different compounds in the body, forming the various tissues and fluids and so forth.

Second, these "chemical substances of which the body is composed are very similiar to those of the foods which nourish it. They are made up of the same chemical elements," says U. S. Farm Bulletin 142. It continues, "They are so combined as to form a great variety of compounds in both body and food. The most important kinds of compounds in the body and in foods are protein, fats, carbohydrates, mineral matter and water."

Third, the body can only get the materials from which it is made in the first place from foods and only from foods can it get the necessary materials with which to repair the tissues destroyed by "wear and tear." Not only must it have foods from which to get the chemical compounds to build and repair itself, but foods must also furnish the substances that are to be oxidized (burned) in the body to give it energy, either in the form of muscular work, or of heat, or both. To quote Bulletin 142 again, "The functions of these compounds in the foods are to build and repair the various tissues of the body and to supply it with heat and muscular energy." The same authority again says, "The chief uses of food, then, are two: First, to form the material of the body and repair its wastes, and; Second, to furnish muscular and other power for the work the body has to do and yield heat to keep the body warm. In forming the tissues and the fluids of the body the food serves for building and repair. In yielding power and heat it serves as fuel."

So much for foods in general: now for the particular kinds of compounds mentioned above as foods, that is, protein, fats, carbohydrates, mineral matter and water. Right at this point we shall interest ourselves only with the first four mentioned; with water considered as a food, as well as with air, we shall deal quite at length later.

PROTEINS—Protein is a name derived from the Greek verb meaning "to take first place" and was

first given to a certain kind of food, a nitrogenous (nitrogen bearing) food, back in 1838 by Mulder because he believed it to be the fundamental constituent of tissue substances. Sherman says: "The plural form, **proteins**, is now used as a group name to cover a large number of different but related nitrogenous organic compounds which are so prominent among the constituents of the tissues and of food that they may still be accorded some degree of preeminence in a study of the chemistry of food and nutrition." Quoting the same author further, we learn that, "Proteins are essential constituents of both plant and animal cells. There is no known life without them. Plants build their own proteins from inorganic material obtained from the soil and air. Animals form the proteins characteristic of their own tissues, but in general they cannot build them up from simple inorganic substances such as suffice for the plants, and must depend upon the digestion products obtained from the proteins of their food."

Proteins are tissue builders; building and repairing tissues are their primary functions; and, while in addition they may also be burned by the body for heat and energy in the absence of enough fats and carbohydrates, yet neither of these latter can take the place of protein in building and repair work. A certain amount of it is absolutely necessary to our continued existence and health, but nothing like the amounts usually taken by those who can afford it is needed. Indeed, comparatively little is needed and when more than sufficient for the body's needs is taken, it may, and often does, prove harmful, thus being not only financially expensive (for the protein foods are nearly always the dearest in price), but physiologically expensive as well. The thing that distinguishes proteins from carbohydrates and fats and which make them physiologically necessary, while at the same time physiologically expensive when consumed to excess, is the element, nitrogen, which

they contain. It is this that is found in proteins that is so absolutely essential to growth and repair of tissue and which is not found in pure fats or pure carbohydrates. Pure fats and pure carbohydrates contain the elements, carbon, oxygen, and hydrogen; but pure proteins contain the elements nitrogen and sulphur in addition, and sometimes phosphorus also. Now sulphur and phosphorus may be obtained from other sources than proteins, but not so nitrogen, that is found in its only available form for human tissue building in the proteins. But while this nitrogen in the form in which it exists in proteins is absolutely necessary, any quantity in excess of the body's needs must be eliminated and this places unnecessary and often harmful work on the excretory organs, particularly the liver and kidneys.

THE PROTEIN FOODS are: The lean of all meats, fowl, game, and fish, including shellfish; the casein (or cheese-making part) of milk; cheese of all kinds; eggs, and dried peas, beans, and lentils, as well as practically all nuts except the chestnut, which is a carbohydrate. Of course, if we derived our supply of protein from only those foods classed as proteins, we should have to eat a considerable quantity of any one of them in order to get enough protein for a day's rations of it; but it so happens that, with the exception of pure fats and pure sugars, we find more or less protein of one kind or another mixed in with our other foods. In fact there is enough protein in most of the foods we eat so that we need pay hardly any conscious attention to the selection of it except to see that we do not get too much. To be sure, there must be a variety of proteins in the diet, for not all proteins are completely adequate to furnish all the material necessary for human growth and repair, as some are lacking in certain necessary substances; nor are all proteins alike in their deficiencies, some being deficient in one substance, some in another. But where a variety

of proteins is eaten, as is usually the case in any liberal diet, the deficiencies of one protein may be made up by another which contains in abundance the very substances in which the first one is lacking; and this need never be a problem to the liberal user of milk and milk products. Eggs in moderation will also prevent any protein deficiency, tho their too liberal use is not to be recommended, milk and the milk products, particularly the former, being far preferable in this respect.

CARBOHYDRATES are energy and heat makers, any excess of them over the body's energy and heat needs being stored in the form of fat, provided digestion and assimilation be good. So far as their purpose in the body is concerned they may be used interchangeably with fats, tho the fats are usually much more expensive and somewhat more difficult of digestion. The carbohydrates are divided into two groups, (a) the SUGARS, and (b) the STARCHES.

(A) Sugars we shall understand to mean all sweets, such as honey, maple syrup, molasses, corn syrup, glucose, maple sugar, milk sugar, malt sugar, and cane or beet sugar (white, brown, or whatever color), as well as such sweet fruits as dates, figs, sweet prunes, raisins, St. John's Bread, and very ripe bananas and persimmons.

(B) Starches include sweet potatoes, white potatoes, and several other varieties of starchy roots resembling sweet and Irish potatoes, grown in tropical and sub-tropical regions, and not much seen in the United States, (see Bulletin 295); all grains, such as wheat, corn, rye, oats, barley, rice and buckwheat, and all their products, whether bread, cake, pie-crust, buckwheat cakes, or what-not; also sago and tapioca, chestnuts, unripe bananas and persimmons, as well as dried peas, beans, and lentils. For, altho these last (the Legumes) are classed as proteins, they are also very rich in starch.

FATS are heat and energy makers, and, as before stated, can be used interchangeably with carbohydrates, tho they are about two and one-half times as rich in fuel value as carbohydrates. Fats include body fats of animals, fowl, game, and fish, as well as butter and cream, of animal origin, and olive oil, cottonseed oil, peanut oil, cocoanut oil, cocoa butter, palm oil, corn oil, and the oils from many nuts, such as English walnuts, Brazil nuts, Italian pine nuts, and almonds, of vegetable origin.

MINERAL MATTER, or the salts of lime, magnesium, potassium, sodium, phosphorus, chlorine, sulphur and iron, go to make bone, to keep the blood alkaline and of proper consistency, and to help make up the digestive juices and other body fluids, as well as the substances secreted by the glands. To get some idea of the importance of a liberal allowance of mineral salts in the diet it is only necessary to know that without iron, for one specific instance, to enter into the composition of the red corpuscles, they (the corpuscles) would be unable to absorb oxygen from the air as the blood passes thru the lungs and carry it to all parts of the body, yielding it up wherever needed. This would result in oxygen starvation. A very striking example to be sure, but each of the other minerals above mentioned is, in its way, almost, if not equally, as important as iron. (See full discussion of this subject in later chapter on mineral salts). Furthermore, it is largely these mineral salts that account for the freedom from constipation on the part of people who eat large quantities of vegetables. This used to be thot due to the "roughage," or indigestible fiber of the vegetables; but recent experiments have proved that it is largely the mineral salts that are responsible for this much desired effect. In one experiment with bran, for instance, it was found that when cows were fed on bran from which the mineral salts had been washed, the cows became constipated, while the pure,

natural bran had a decidedly laxative effect, proving conclusively in this case the great importance of these mineral salts. And the fact that fruit and vegetable juices (apple cider, for instance) when taken, apart from the pulp or fiber, produce laxative effects in our own bodies is good proof of the laxative qualities of the mineral salts.

Since there are eight of these mineral salts, which would be too many to keep in mind separately, and since at least several of them are always found together in the same article of food, we shall give them a group or family name. And further, since they are found in greatest profusion and purity and in most easily assimilated form in the vegetables and fruits, we shall know them hereafter as the **SUCCULENT FOODS**. This does not mean that there are none of them in other foods (grains, for example, contain them plentifully, and some minerals are found in practically all foods except purified fats and purified carbohydrates), but the Succulent Foods are far richer in them, particularly the alkaline mineral salts. Nor does this mean that the Succulent Foods contain no other nutriment, for there are minute quantities of fat and small quantities of protein in most of these foods, while many of them are quite rich in carbohydrates, principally in the form of glucose (fruit sugar) and sucrose (cane sugar, this substance, when found in the plants, being identical with the manufactured product); but in an ordinary diet furnishing nearly enough proteins, fats, and carbohydrates, the Succulent Foods are useful principally for the mineral salts which they contain. Or, as U. S. Bulletin 295 puts it, "Perhaps one of the most important functions of these (Succulent Foods) is to supply the body with mineral salts which are needed for the building and repair of tissue, for the proper carrying out of the physiological functions, and particularly to insure the alkalinity of the blood." In another Government bulletin Professor Langworthy, in speaking of

the value of Succulent Foods in the diet, points out that, besides their value as mineral containers, they are also valuable to give bulk and variety to the diet. He says, "Their value in the diet, therefore, and they have a decided value, lies not in any large quantity of nutriment, but in small quantities of special materials (mineral salts) which they provide and the bulk which they give the diet, and also in their appetizing qualities, their flavor and appearance, and the variety which they make possible." And, let me add, had he written the foregoing since the recent experiments and wonderful discoveries of that genius of nutrition, Prof. E. V. McCollum, he would have given at least equal importance to the "vitamins," of which more later. So you see that while "one of the most important functions of these foods is to supply the body with mineral salts," yet for a variety of other reasons we cannot call them "mineral foods," and hence we must call them by some other name that better describes them as a class, so we shall call them **SUCCULENT FOODS** hereafter.

The **SUCCULENT FOODS** include the following: (a) roots, such as carrots, turnips, parsnips, kohlrabi, beets, Jerusalem artichokes, celeriac, salsify (oyster plant), black salsify, radishes, onions, garlic, and a number of condimental roots, which, since we do not believe in condiments, we shall not enumerate. Potatoes and starchy roots have already been classified under the heading "Starches."

(B) **POTHERBS** or **GREENS**, such as spinach, kale, cabbage, cabbage sprouts, Savoy cabbage, Chinese cabbage, collards, turnip tops, radish tops, beet tops, chard, mustard, Brussels sprouts, celery, the leaves of dasheen, dandelion, sorrel, yellow dock, pigweed, chickweed, marsh marigold, purslane (pulse), cactus leaves and stalks, poke sprouts, young milkweed shoots, tender blackberry shoots, and even tender brakes and ferns; and other vegetables frequently prepared and served similarly to greens are asparagus, hop sprouts,

bamboo shoots, (especially in Orient), green corn, green peas, green cowpeas, tender beans of different varieties, snapbeans, also okra and the tender green pods of cowpeas or field-peas. Still other vegetables not greens in the strictest sense of the term, but cooked and served as such and answering much the same purpose in the diet, are the flowers: cauliflower, broccoli, and globe or French artichoke, and such fruits as egg plant, green peppers, tomatoes, squash, and pumpkin.

(C) SALAD PLANTS, including lettuce, celery, endive, romaine, green onions, water and garden cress, tender spinach, young dandelion leaves, peppergrass, cabbage (in fact it is almost a shame to serve cabbage or celery in any other style than as a raw salad at any time, unless it is so tough or wilted as to need cooking), chicory, and cucumbers and tomatoes, which our Government considers fruit.

(D) BLAND or NON-ACID FRUITS including watermelon, muskmelon, honey-dew melon, ice cream melon, Christmas melon, and various other kinds of melons, as well as canteloupes and casawbas; also pears, grapes, fresh figs, huckleberries, mulberries, sweet apples, and fresh persimmons.

(E) SUB-ACID FRUITS, such as cherries, plums, and fresh prunes, peaches, mild apples, blackberries, raspberries (red and black), apricots, nectarines, and tomatoes (U. S. Bulletin 293).

(F) ACID FRUITS include limes, lemons, grapefruit, oranges, pineapples, loganberries, cranberries, strawberries, sour apples, currants, gooseberries, pomegranates, rhubarb stalks, and in fact all fruits having a distinctly sour taste in their natural, unseasoned state.

See Insert for Summary of Food Classification.

PROTEINS	ANIMAL	{ Cheese (including casein of milk) Eggs Lean meats, fish, fowl, game, etc.
	VEGETABLE	{ Dried beans, lentils, peas Nuts (except chestnuts)
CARBOHYDRATES	SUGARS	{ Bananas (very ripe), beet sugar, cane sugar (brown, white or other color), corn syrup, dates, figs, glucose, honey, malt sugar, maple sugar, maple syrup, milk sugar, molasses, persimmons (very ripe), prunes (sweet), raisins, St. John's bread.
	STARCHES	{ Bananas (unripe), barley, beans, cereal grain, flours, chestnuts, corn, lentils, oats, persimmons (unripe), peas, potatoes (white and sweet), rice, rye, sago, tapioca, tropical starch-bearing roots, wheat.
FATS	ANIMAL	{ Animal body fats, lard, etc. Butter Cream
	VEGETABLE	{ Cocoa butter, cocoanut oil, corn oil, cotton seed oil, nut oils (almonds, Brazil nuts, English walnuts, Italian pine nuts, etc.), olive oil, palm oil, peanut oil.
WATER		
SUCCULENT FOODS (MINERAL AND VITAMINE CONTAINING FOODS).	ROOTS	{ Beets, black salsify, carrots, celeriac, garlic, kohlrabi, onions, parsnips, radishes, salsify (oyster plant), turnips.
	POT HERBS OR GREENS	{ Artichoke (French globe), asparagus, beans (green), beet tops, broccoli, Brussels sprouts, cabbage (all kinds), cauliflower, celery, chard, chickweed, collards (all kinds), corn (green), dandelion, dasheen leaves, dock (yellow), kale, marsh marigold, mustard, okra, peas (green), peppers (green), pigweed, poke sprouts, pumpkin, purslane (pusley), radish tops, sorrel, spinach, sprouts and shoots (various kinds), squash, tomatoes, turnip tops.
	SALAD PLANTS	{ Cabbage, celery, chicory, cress (water and garden), cucumbers, dandelion, endive, lettuce, onions (green), peppergrass, romaine, spinach (tender), tomatoes.
	NON-ACID FRUITS (BLAND)	{ Apples (sweet), casawba, canteloupe, Christmas melon, figs (fresh), grapes, honey-dew melon, huckleberries, ice cream melons (and melons of other varieties than those named), muskmelon, mulberries, pears, Persian melons, persimmons (fresh), watermelon.
	SUB-ACID FRUITS	{ Apples (mild), apricots, blackberries, cherries, nectarines, peaches, plums, prunes (fresh), raspberries (red and black), tomatoes.
	ACID FRUITS	{ Apples (sour), cranberries, currants, gooseberries, lemons, limes, loganberries, oranges, pineapples, pomegranates, rhubarb stalks, strawberries, (all fruits distinctly sour).

CHAPTER III.

Rules of Eating.

Having classified the different foods, each in the group into which it naturally falls, and told the purposes of each group, let us now proceed with the rules for eating them correctly. Assuming that they have been cooked properly, that is, in accordance with the principles of cooking outlined in the chapter on cooking (which see, as it is very important), remember that foods begin to be digested in the mouth. Judging by the way most people eat whom I have observed eating in the various restaurants, this is a discovery to most of you. A great many people seem to think digestion begins in the stomach, that is, if they take the trouble to think about it at all. So right here for the benefit of all and sundry I am going to lay down as the first rule of correct eating, a rule of transcendental importance: **CHEW YOUR FOOD THOROLY**, not merely until it becomes soft enough to be swallowed without choking you, but **UNTIL YOU HAVE CHEWED IT TO A LIQUID AND HAVE EXTRACTED ALL THE FLAVOR FROM IT**. And **CHEW LIQUID FOODS THE SAME WAY**; that applies to everything but water. Macfadden says: "Chew your food; your stomach has no teeth! And he might have added: "Taste your food; your stomach has no taste buds!" Why do you suppose you so enjoy eating? Because in eating, the sense of taste is pleased. That the sense of taste is pleased is probably a wise provision on the part of Nature to see that man did not let his natural laziness cause his extermination from starvation. The sense of taste, then, is evidently a most useful and necessary one. So much for the sense of taste. Of what use is the flavor of food, and why do we seek to impart a flavor to it when it has none, or to give it a pleasing flavor when it has a

displeasing one? To please the sense of taste! And where is this sense of taste found? In the mouth. Has the stomach a sense of taste? No. Then food cannot be tasted in the stomach. You must taste food in the mouth where it can be tasted! After it leaves the mouth it is too late to taste it—except it has an echo (as garlic, or onions, or hamburger steak, or other fried foods). But you do have this sense of taste in your mouth and it gives you pleasure. And you also have foods that have flavor. Therefore, since your stomach has no taste buds, and your mouth has, why not use this pleasure-giving sense and the flavor of foods for all they are worth, **BY TASTING ALL THE FLAVOR OUT OF ALL THE FOOD YOU EAT? TASTE IT UNTIL NO FLAVOR IS LEFT IN IT** before swallowing it.

Yes, you do have time! Try it and see. Suppose, for example, your lunch period is just long enough to permit you to go to the nearest restaurant or dairy lunch counter and wash down a couple of sandwiches with a cup of coffee or some other beverage and get back to the office. Tomorrow try this: go to your favorite eating place and order but **ONE** sandwich and a glass of milk or buttermilk. Then take the time you usually give to two sandwiches for one and chew it to a liquid and extract all the taste from that liquid before you attempt to swallow it. Also be sure and have your mouth empty of food when you take a drink of whatever you are drinking, and taste all the taste out of that also. This will mean that you will have to cut out the conversation and the reading of the paper and devote your whole attention to the business in hand. Take a tip from the dog; even the mildest tempered of dogs will tolerate no interference when eating. He wants that to be an uninterrupted period of pleasure, and he will fight to make it so. Only a few days ago the writer saw a sallow-complected, sunken-cheeked, hollow-eyed, line-faced individual with

dark sacks under his eyes and a general expression of chronic ill-temper (that is chronic sickness) on his face, sitting in a restaurant eating a good-sized meal for a lumberjack and reading the inevitable paper. He spent just forty minutes at it—two minutes chewing and swallowing the food and thirty-eight minutes reading. And he had about him the air of a man who thinks he is eating slowly. Why, that meal should have taken an hour at least without any reading, if he had chewed properly. Furthermore, I doubt whether he could have eaten that entire meal, had he chewed it properly; his jaw muscles couldn't have stood it. No one could eat as much as some of us do and chew it thoroly! Not only would our jaw muscles tire out, but we would lose our appetites long before we could finish the meal; we would lose our taste for food—and this does not take into account the matter of time which is limited for us all.

Thoro mastication will result in six different benefits:

First—It will give us more pleasure from eating.

Second—We shall naturally eat much less.

Third—We shall get much more good from what we do eat, and therefore, shall need less.

Fourth—We shall immeasurably lighten the work of the other digestive organs and thus preserve them in good health, thereby benefiting the whole body and working a great economy in the matter of doctor bills.

Fifth—We shall not be troubled with heavy-headedness after meals, nor will we have foul breaths, coated tongues, nor be bothered with gas in the intestines, nor the belching of bad flavored gases after meals.

Sixth—We shall preserve our teeth, for the exercise thus afforded our jaws will cause an increased flow of blood to the jaws and teeth, which is a prime requisite for the health and preservation of the teeth as of any other part of the body. (Read Horace Fletch-

er's, "The A. B. Z. of Our Own Nutrition." It's a wonderful book).

To sum up, then, in a few words, we shall reap immense physical and decided financial gains from the process, not to mention the happiness and joy resulting from these gains and the general sense of freedom and well-being that comes from an unbefouled digestive tract.

Another rule that is almost, if not equally, as important as the foregoing rule about chewing the food is the rule: **NEVER EAT UNLESS HUNGRY!** Do not eat just because it is meal time. If not hungry at your regular mealtime, do not eat until the next regular mealtime that you are hungry. No matter if it is a week, wait! No one ever yet died waiting for a normal desire for food, but hosts have cut their lives short by eating without normal hunger. When the body needs food it will make its needs known by signs unmistakable. To eat food when the body does not need it is not only a waste of food, but a crime against the body as well. No animal but man will eat when not hungry. Food that is not needed is very likely not to be digested, and whether it is or not, it is harmful. If it is not digested it must be excreted, and the chances are ninety-nine in one hundred that it will decompose before it can be gotten rid of. If it is digested it can only result in accumulation of surperfluous flesh and a general clogging of the body with the excess nutriment. If you are not hungry at the regular mealtime, the quickest way of getting a normal appetite is to go without eating—and to take open-air exercise. If this course is persisted in, not only will a normal hunger for food soon return, but the digestive organs will be relieved of a totally unnecessary burden, the excretory organs will also escape much unnecessary work, and the whole body will benefit immensely thereby. Another thing, if you cannot make up your mind what you want to eat, you are not hungry. If you are really

hungry you will desire plain, wholesome food; you will not need fancy dishes to tempt you to eat.

General Rules for Combining Foods.

RULE I—PROTEINS may be eaten with any other foods, except concentrated **STARCHES AND GRANULATED SUGAR**; grain foods and flesh foods form a particularly bad combination. And granulated sugar and meat are worse. Two kinds of concentrated proteins should not be eaten at the same meal. Proteins are best eaten with the **SUCCULENT FOODS**.

RULE II—MILK, tho mentioned under the proteins, can hardly be called a concentrated protein and hence may be eaten with starches, or with any other food, except—particularly in the case of one with “acid stomach”—acid fruits. People with normal digestion need have no fear of combining acid fruits and milk, provided only, that they have not already eaten too great a mixture of foods, or broken some rule here laid down. Nor is it advisable to drink milk at a meal already rich in protein, particularly of the flesh or fish variety, tho milk is permissable with eggs in moderation. Milk may best be eaten with **CARBOHYDRATES**.

RULE III—FATS (unfried) may be eaten with almost anything but other foods rich in fat or oil; hence should not be eaten with nuts. When nuts are eaten at a meal no other fat is necessary at that meal. Fats may best be eaten with **SUCCULENT FOODS**. Fried fats, or things cooked in fried fats, are taboo, unfit for human consumption.

RULE IV—CARBOHYDRATES: (a) **SUGARS** may be eaten with any other food, except concentrated Starches or flesh foods, but are particularly good combined with Milk or Succulent Foods. This applies particularly to granulated sugar, which is a highly concentrated food and should be eaten with other foods that are

more bulky and less concentrated, as the Succulent Foods, and never with STARCHES. However, the sweet fruits may safely be eaten in moderation with any other food except concentrated starches.

(b) STARCHES (concentrated) may be eaten with any foods other than concentrated proteins, acid fruits, sub-acid fruits, and sugars, particularly granulated sugar. Nor is it advisable to eat two or more starches at the same meal, as bread and potatoes; one is enough.

RULE V—SUCCULENT FOODS may be eaten with any other kind of food (except in the case of Acid Fruits which may not be combined with milk, and both Acid and Sub-Acid Fruits which may not be eaten with Starches). Aside from these exceptions, however, Succulent Foods can and should be used in combination with any other kinds of foods at a meal. Acid and Sub-Acid Fruits, with the exception just noted (that is, in combination with Milk and Starches), may safely be eaten with any other kind of food and are particularly desirable with Proteins, tho it is well to note here that this should except peas, beans, and lentils, which also contain much starch in addition to their protein.

From the foregoing rules we get four "DON'TS" which follow:

First—DON'T combine Proteins and concentrated Starches at the same meal; particularly do not combine flesh foods and grain foods, or flesh foods and granulated sugar.

Second—DON'T combine Milk and Acid Fruits (if you have "acid stomach"), or milk and flesh foods at the same meal.

Third—DON'T eat sugar on your mush or other cereal (mushes aren't fit food for thinking humans, anyway), and avoid heavy sweets and sweet desserts after a meal containing much starch.

Four—DON'T combine Starches and Acid or Sub-Acid Fruits at the same meal.

A Few More Dont's.

DON'T eat two or more concentrated foods, whether starches, sugars or proteins at the same meal, and never make a meal of concentrated food exclusively; always eat your concentrated foods with other less concentrated, more bulky foods, such as Roots, Greens and Salads.

DON'T eat too many articles of food at one meal.

DON'T eat pepper and other spices, or ketchup and other condiments.

DON'T eat sour pickles, or things pickled in vinegar and spices.

DON'T eat rich preserves, or highly seasoned dishes. In addition to such things being bad dietetic practice, who knows to what degree a food so flavored may be spoiled, the seasoning being used to fool a sense of taste that would otherwise never let such food get by the mouth? Don't eat such things!

DON'T eat much salt; very little is plenty.

DON'T eat much grain food. Americans generally eat too much grain products and this practice alone I find to be one of the chief factors in "Acid Stomach," a very prevalent disease among Americans. This admonition holds particularly true for adults; growing youngsters can safely eat more grain foods than adults. But they must be very thoroly chewed, no matter by whom eaten. Eat less bread and more potatoes; they are much easier of digestion and will, if not eaten to such excess that they ferment in the intestines, go far toward keeping the blood alkaline.

DON'T eat canned and preserved meats; and the less meat you eat of any kind the better for your health. Of course, you may eat moderately of meat, if you are normal to begin with, and continue to enjoy good health. BUT you may also live absolutely without meat and enjoy just as good health—for a lot less expense! Other Protein foods, particularly milk and its

products, eggs, and nuts, furnish just as desirable a form of Protein minus the broken down products found in all meat as the result of the animal's activities before slaughter. These products of animal katabolism (breaking down of tissue) cannot be eliminated as they are incidental to life itself, and when the animal is killed there is no way of getting rid of these waste products without destroying the meat altogether. Hence, not only is the Protein of milk, cheese, eggs, nuts, etc., more economical, it is also far more wholesome.

DON'T eat between meals; your stomach needs some rest; and besides you can eat more than sufficient in three meals without going to the trouble of overloading your system with more foods between times. Bad as is this eating between meals at any time, it is particularly bad before going to bed. Don't do it. If you want fruit, or ice-cream, or candy, eat them at meal time as part of the meal—not as an addition to an already heavy meal. Candy (because of its great sugar content) is very irritating to the stomach and intestines when eaten alone, especially if eaten in any quantity; ice-cream, while not as irritating as candy, entails a considerable amount of work in digestion; even fruit calls for considerable digestive work. Eating between meals is, then, not only a terrible economic waste, a waste of good food, but causes an undue and undesirable strain on the digestive organs, and sooner or later will cause very serious digestive ills. Don't do it!

DON'T swallow a morsel of food without first chewing it to a liquid and tasting all the taste out of it, particularly starches. (Pardon the repetition). Two of the worst enemies of thoro chewing are (a) eating soft, mushy foods, that seem already in condition to swallow without chewing. (b) Eating too fast, that is, taking one spoonful right on top of another and continuing the process until the meal is eaten. This is a very bad practice. Take a mouthful, a decent mouth-

ful—not all you can cram into the mouth—and take no more until that mouthful is disposed of. If you catch yourself cramming it in too fast, lay down your tools and shove your plate away from you until you are sure you can control yourself and then start over. In this way you will gradually get so accustomed to eating right that you will do it automatically.

In the foregoing rules I have spoken of concentrated (much nourishment in little bulk) foods; let me here explain that all Carbohydrates, except potatoes (sweet and white) and bananas are concentrated foods, as are all proteins, except shellfish and milk; so are all fats concentrated foods. However, there is much less tendency to overeat of fats than of either of the others, probably because fats are more expensive, weight for weight, than the others (proteins or carbohydrates) and because they are generally considered “too rich” to be eaten freely. Hence the rule not to combine two concentrated foods at the same meal would not be taken to exclude a moderate amount of butter, or olive oil, or fat meat at the same meal with either concentrated starches or proteins. The reason for not serving two or more concentrated foods at the same meal should be obvious to anybody. The principal reason is that when one has two or more concentrated foods on the table, one or more of these is very likely to be there in lieu of the more bulky, less concentrated Succulent Foods. And since one very commonly eats until a feeling of satisfaction, if not of actual fullness, is reached, the result is that one eats as much (in quantity) of each of these concentrated foods as would suffice for a meal by itself and the total fuel value thus taken in may be from three to five or six times what would otherwise be taken. Thus, a meal consisting of a half-pound of round steak, four ounces of bread, half an ounce of jelly, a salad, and a dish of tapioca, would furnish far more food or fuel value than a meal made up of half a pound of round steak, four

ounces of carrots, or turnips, or even potatoes, a dish of spinach, a salad, and a slice of watermelon. Naturally, since we nearly all overeat, particularly the sedentarily employed, the latter meal would be the far better choice from both a financial and a health point of view. If you would live economically, then, and healthfully, always follow this method of eating but one concentrated food at a meal, and making the bulk of the meal from Succulent Foods, ever having in mind the rule against combining acids or sub-acids with starches.

CHAPTER IV.

Illustrative Menus.

In using these menus, remember, that while they are absolutely correct, you also can make menus that are absolutely correct by simply following the rules already given, or, more simply still, by merely substituting for any given food in any menu another food from the same group. Thus, if the protein food given in a menu is eggs, substitute cheese, or nuts, etc., If one form of starch is given, substitute another: and for one sweet fruit substitute another. If you want spinach in a menu where kale is given, simply substitute spinach, or, if you prefer carrots to beets, substitute carrots; and if celery seems better than lettuce, by all means replace the lettuce with celery. Thus, you can make an unlimited number of different menus from the few given below and can make them according to what is in season at no matter what time of year. Only be sure that in substituting one food for another you always substitute one of the same group. For instance never substitute eggs for potatoes, oranges for bananas, etc.

Winter Menus for Business or Professional Man.

Breakfast:

Baked apple, with or without cream.
One or two tablespoonfuls of shelled nuts.
Banana—dead ripe, or baked, with cream, or diluted nut butter, or milk.
Cup of Postum, or other cereal coffee, if desired.

Luncheon:

Bread—whole wheat, corn, rye—and butter, or baked potato.
Salad with no acid dressing; oil and salt dressing, if wanted.
Stewed peas, corn or carrots—your choice of one of these.
Stewed figs or canned pears.

OR

Why not try simply a whole wheat bread peanut butter sandwich and a glass of milk? It is a fine luncheon for a busy business man and, if properly chewed, will not cause dullness or sleepiness.

Dinner:

Soup (if desired), say celery soup, or even cream tomato soup.
Carrots cooked in milk (see chapter on cooking), or baked potato.
Cottage cheese, or other cheese.
Salad of cabbage, celery and apples.
Cauliflower (or broccoli).
Cup of custard, or jello.

Spring Menus for Business and Professional Man.

Breakfast:

One or two poached eggs.
Bran muffins.
Canned pears, or stewed prunes.
Cereal coffee, if desired.

Luncheon:

Raw salad.
Baked potato.
Creamed onions.
Ice cream.

Dinner:

Spinach, cabbage sprouts, mustard greens, choice of one of these.
Parsnips.
Raw salad.
Fish—boiled, broiled, or baked, with tomato sauce, if desired.
Strawberries, cherries, or other seasoned fruit.

Summer Menus for Business or Professional Man.**Breakfast:**

Cherries or berries.
Eggs, one or two poached.
Bananas, dead ripe or baked, served with cream or dilute nut butter.

Luncheon:

Tomato, lettuce, and cucumber salad.
Cottage cheese.
Carrots, beets or turnips.
Watermelon or other seasonal fruits.

Dinner:

Salad of grated carrots, chopped cabbage and raisins.
Baked potato, eaten skins and all.
Summer squash.
Cantaloupe, or other seasonal non-acid fruit.
Glass of milk, if desired.

Fall Menus for Business or Professional Man.**Breakfast:**

Grapes.
One or two tablespoonfuls of shelled almonds.
Dead ripe banana and cream.
Glass of milk.

Luncheon:

Celery, tomato and lettuce salad.
Squash.
Portion of cheese, your favorite variety.
Casawba, or other fruit of the melon family.

Dinner:

Salad of shredded cabbage, grated carrots and chopped
ripe olives.
Baked sweet potatoes, or white ones.
Boiled onions.
Pears, or grapes, or other bland fruit.

Winter Menus for Working Man.**Breakfast:**

Cereal—mush made of whole wheat, or other grain, thoroughly boiled and served with cream or milk, but no sugar.
Dish of stewed sweet prunes, or other sweet fruit.
Glass or two of warmed—not cooked—milk, or cup of cereal coffee.

Luncheon:

Whole wheat or other whole grain bread, peanut butter sandwiches.
Glass of some kind of canned vegetable, or,
Glass of salad.
Some figs, or other sweet fruits, and some nuts.

OR

A lunch I have recommended with very gratifying results to quite a number of working men: one quart of sweet milk, or buttermilk, and some sweet fruit, and a few nuts.

Dinner:

Baked fish, game, or meat.
Creamed carrots, or baked potato.
Cauliflower.
Salad of celery, apple, and cabbage with some raisins stirred in.
Cup of custard, or jello.

Spring Menus for Working Man.

Breakfast:

Rhubarb and raisins stewed together.

One or two poached eggs.

One or two dead ripe bananas with cream or dilute nut butter.

Cereal coffee.

Luncheon:

Whole wheat bread and butter.

Canned vegetables (preferably home canned or dried).

Salad of one or more raw vegetables, choice of market.

Sweet fruits and nuts.

Dinner:

Parsnips or potato, baked.

Spinach.

Fish or fowl.

Raw salad.

Fresh seasonal fruit, or canned, or dried fruit, your choice.

Summer Menus for Working Man.

Breakfast:

Melon.

Bananas, dead ripe, with cream.

Poached eggs.

Glass or two of milk or buttermilk.

Luncheon:

Whole wheat bread and butter and lettuce sandwiches.

Glass of green peas.

Fresh sweet fruit.

Nuts.

Dinner:

Beets or turnips.

Mustard or spinach.

Cottage cheese.

Salad of celery, cabbage, and lettuce.

Oatmeal cookies, or cookies made of bran and whole wheat and raisins.

Fall Menus for Working Man.

Breakfast:

Casawba or other melon or pears.
Bran muffins.
Sweet fruits.
Shelled nuts.
Glass of milk.

Luncheon:

Whole wheat (or rye) bread and butter.
Green corn on cob.
Radishes or cucumbers.
Grapes.

Dinner:

Salad of tomatoes, cucumber and onions.
Summer squash or egg plant.
Game, fowl, or fish.
Beets, turnips, or rutabagas.
Fresh fruit.

It will be noticed here that more of the concentrated foods are allowed the working man than the professional or business man. This is as it should be, for no one would maintain that an indoor sedentary worker should have as much of the energy and heat-makers as the hard working outdoor laborer. Professional and business women and working women require about the same kind and four-fifths of the amount of food needed by professional and business men and working men respectively.

CHAPTER V.

Diet for Children.

Children of different ages, sizes, and of different degrees of activity will require different amounts of food, tho the quality should always be of the best, that is, the simplest and most natural. For children under ten, and particularly those under five years of age, milk

should always constitute a very fair proportion of the diet. Of course, for infants not yet weaned, milk either mother's (most preferably) or that of cows or goats, is the only food; for such youngsters it is absolutely essential. To be sure they may and should be allowed small quantities of fruit and vegetable juices; these will prevent constipation and go far toward helping build healthy little bodies. After weaning, however, milk should constitute a good share of the diet, especially until the fifth or sixth year, or longer, gradually supplemented, of course, by an increasingly large allowance of succulent foods and sweet fruits, as well as some potato and grain foods—whole grain products, not devitalized white flour products. From this time on a child's diet should be confined to milk and its products, succulent foods, potatoes, whole grain foods, sweet fruits in abundance, eggs, legumes in moderation, and nuts. Regarding the use of nuts by children it may be here remarked that parents often complain that tho their children are very fond of nuts, they cause digestive disturbances. To this complaint I always answer that the same is true of grown ups when they eat nuts as children are usually allowed to eat them. That is, to eat too many in the first place and to chew them too little in the second place. In eating nuts as in eating many other foods, a good motto for either adults or children is: "Eat less and eat it more." Remember that nuts are a very rich food and not to be eaten as freely as apples or other foods of low fuel value. Once more, then, to avoid digestive disturbances in either yourself or your children following the use of nuts in the dietary, eat them in small quantities and chew them very thoroly. It requires closer attention to chew nuts thoroly than is required in the case of almost any other food. But it can be done. And if it is done, they are one of the most valuable of all man's foods. Furthermore, if children are taught to chew properly from the time they first start to take nourish-

ment other than that from the breast or bottle, they will have no more trouble with nuts than with any other food. Give children absolutely no soft foods from the time they begin to eat foods other than milk, and the problem of correct chewing, as well as the problem of proper formation of teeth and jaws and the problem of adenoids, will solve itself. Feed hard foods that the youngster must chew, even if he has no teeth and has to "gum it;" particularly should all the starchy food that a baby gets be hard. Liquid starchy foods, mushes, and pappy foods in general are responsible for a host of children's diseases. Feed hard foods. Those growing jaws and developing teeth need the exercise to make them grow and develop properly.

Once more let me repeat that children are much better off if they get their protein from milk and its products, eggs, and nuts than if they are allowed meats. Likewise, children's sweets must be in the form of sweet fruits and not as candies. Never let a child have soda fountain concoctions; they are bad enough for grown-ups to ruin their stomachs and poison their systems with. But to let children have them is a crime. Therefore, if you don't want your child to reproach you in after years with the crime of ruining his digestion, as well as causing him to have numerous "children's diseases" and unnecessary operations for tonsils and adenoids, don't feed him meats and candies and cakes and pies, as soon as he is weaned. He will still have plenty of time to learn these with other vices when he reaches the "age of discretion." There is little to choose between habitual candy eating or soda water drinking and cigarette smoking so far as they effect the health; if there is, I am sure the choice lies with the cigarette smoking. Also, I have yet to see a single instance of adenoids or tonsil trouble that was not caused by either or all of the following: Excessive eating of sugar and candies and drinking of soda waters; excessive meat eating; excessive consumption of grain

products; and the mixing of starches and acids or sub-acids at one and the same meal. This might be said with almost equal force of practically every so-called "childrens" disease," high-priced children's specialists to the contrary notwithstanding. Teach your children to eat normally of plain, wholesome, natural foods, unspoiled by high seasoning and fancy cookery; let them follow their play instincts, and watch the children's specialist pass by on the other side.

CHAPTER VI.

Preparation of Foods for the Table.

Cooking is the application of heat to articles of food for the following purposes: (a) to make them more digestible; (b) to make them more palatable; and (c) incidentally to kill whatever parasitic organisms may be present. Certain foods, such as grains, Italian chest-nuts, and the legumes, including peanuts, are very hard of digestion when eaten raw. They can be digested, eaten raw, by most people, but at a tremendous expenditure of energy; and under present conditions no one wants to spend all his energy digesting foods that could be digested far easier and made much more palatable by cooking. We need our energies for the business of earning enough to procure foods to eat; not merely to digest them. Hence, we render these and many other foods more readily digestible by cooking them. This is brought about by virtue of the fact that the cooking breaks down the cellulose, or woody fiber of vegetable foods surrounding the contained nutriment and allows the digestive juices to come freely into contact with every particle of nourishment and thus to render it available for absorption into the blood and assimilation by the tissues. Likewise, in meat the muscular fibers are enclosed in a tough sheath-like envelope that makes

it very hard for the digestive juices to get at them and cooking breaks down this sheath and allows the digestive juices free access to the nutrient muscular fibers. Not only does cooking thus render some foods more easily digestible, but makes many of them far more palatable. Most anyone will agree that a well-cooked piece of meat is more appetizing than the same meat raw; and very few would claim raw legumes to be more palatable than the same foods properly cooked. As to the killing of parasites that may be present in the food, this is particularly applicable to meats. Some of our most disgusting diseases (fortunately not very common in this country, at least) come from parasites taken in with raw or insufficiently cooked meat. If you must eat meat, then, by all means be sure it is properly cooked.

Cooking, then, is an art that may be of inestimable advantage in that it renders fit for our consumption foods that would otherwise be ill adapted to our use by making them easier of digestion, as well as more palatable and more wholesome. In fact, the importance of the part played by cooking in the evolution of man can hardly be overestimated. If you would realize to what extent the mental progress of the race is due to cooking just try living for a few days on a liberal allowance of raw legumes, raw grains, and raw chestnuts and then try to do some good mental work calling for a clear head and keen thinking.

But on the other hand, cooking is an art that has been much abused. There has been entirely too much attention paid to cooking foods so as not only to make them more palatable, but to give them an overstimulating appeal to the appetite thru the sense of taste and smell. This has led to gross overeating. Also the attempt to cook things tastily has led to a heavy use of spices and condiments which not only excite an abnormal desire for food and cause overeating, but are very irritating to the mucous lining of the whole ali-

mentary tract and in time, play a large part in the production of digestive and other bodily disturbances. No one will eat the same quantity of plainly cooked wholesome foods that he will of the highly seasoned foods prepared by the "good cook." Try the plain cooking and see. And not only that, but one living on the properly prepared foods will, by virtue of not overloading and not being irritated by spices and condiments, greatly increase his efficiency, both physically and mentally. If it is a handicap to overload the digestive organs by eating certain foods raw, it is an even greater handicap to dissipate all your energies disposing of foods eaten to excess on account of being overcooked and highly seasoned.

Therefore, since cooking may be advantageous or disadvantageous accordingly as it is done properly or improperly, let us now learn how to cook properly. Those desirous of learning how to spoil food by improper cooking may look to the fancy cook books; here we shall be concerned only with the healthful way of cooking, which is also the economical way.

Methods of Cooking include boiling, stewing or simmering, steaming, baking, roasting, broiling, and frying, but frying is really not a method of cooking at all but a good way of spoiling otherwise good foods.

Water is converted into steam at a temperature of 212 degrees Fahrenheit; the process is accompanied by violent agitation of the water. Foods cooked in water raised to this temperature, or in other liquids undergoing violent agitation as a result of the heat applied, are said to be boiled. Before water reaches the boiling point, at a temperature of about 180 degrees F., bubbles form at the bottom of the vessel and slowly escape upward thru the liquid, causing but a very mild agitation of the liquid; this is called stewing or simmering. Steaming is, as the name implies, the process of subjecting the food not to water itself, but to the steam generated by the boiling. Baking is the process

of cooking foods by dry heat in the oven and calls for a considerably higher degree of temperature than is required in simmering or boiling. Roasting, as the term is now used, is really the same as baking, tho colloquially roasting is the term applied to oven cooking of most meats and fowl, while potatoes, beans, and other such foods are said to be baked. Other forms of baking are cooking en casserole and escaloping. Broiling is the subjection of meats to the direct heat of fire, a process that was called roasting in days gone by when meats were cooked by being exposed to the heat of glowing coals and embers. Broiling is also sometimes done by putting the meat into a pan without grease and then cooking over a fairly hot fire, turning the meat frequently to prevent burning and to insure even cooking; this is called pan broiling. When this same process is used with the addition of grease it is called frying, the just object of the doctor's wrath. And here let me state that the chief reason why frying is so objectionable is that the fat in which the frying is done is so changed by the heat that it is rendered indigestible, and this indigestible grease forms a coating over all the food with which it comes in contact, thus rendering whatever is cooked in it inaccessible to the digestive juices and therefore indigestible.

In general it may be said that in cooking vegetables by boiling it is best to use as little water as will suffice and to serve the resulting juices with the vegetable itself. This prevents waste of the valuable mineral salts and other nutrients that would be lost if the vegetable were cooked in much water and then drained. Where desired the juice may be drained off and served as a drink or used in soup; but never under any circumstances throw away this juice, which is frequently the most valuable part of the dish. There are, however, two exceptions to this, viz: cauliflower and cabbage (including all members of the cabbage family—mustard, kale, brussels sprouts, etc). On account of the

relatively high sulphur content of these, which is liable to form gas in the intestines, they should be cooked in an open vessel with plenty of water. Cabbage may be boiled vigorously until tender; cauliflower is better simmered, as it breaks to pieces when boiled hard. No vegetable should be cooked longer than just enough to make it tender. To quote Maria Parloa in U. S. Farmer's Bulletin 256, Preparation of Vegetables for the Table: "During the cooking of all kinds of foods gases are developed which, if retained in the food, give it a strong flavor and odor, and which there is reason to believe, are injurious. If the food be thoroly ventilated while cooking, the gases will pass off in the steam." She also says that thoro ventilation of foods while cooking gives them a better flavor and renders them more wholesome than those that are not so ventilated. Then she points out the dangers of overcooking as follows: "Overcooking changes and toughens the texture of vegetables. Overcooked vegetables are inferior in appearance and flavor and often indigestible (that is, promotive of digestive disturbances) as well as unpalatable." Also, the losses due to improper cooking are appalling. For instance, to quote from U. S. Bulletin 43 on cooking potatoes: "(1) In order to obtain the highest food value, potatoes should not be peeled before cooking. (2) When potatoes are peeled before cooking, the least loss is sustained by putting them directly into hot water and boiling as rapidly as possible. Even then the loss is very considerable. (3) If potatoes are peeled and soaked in cold water before boiling, the loss of nutrients is very great, especially of protein matter. In a bushel of potatoes the loss would be equivalent to a pound of sirloin steak."

On the cooking of carrots this authority says that "(1) the pieces should be large rather than small; (2) the boiling should be rapid; (3) as little water as possible should be used; (4) if the water extracted be used as food along with the carrots, instead of being

thrown away, the loss of 20 to 30 per cent, or even more, of the total food value may be prevented."

On the cooking of cabbage he says that unless the water in which cabbage is cooked is also used "the loss is large," amounting to one third to one half of the total nutrients. But we have already seen that the water in which cabbage is cooked is liable to cause intestinal gas on account of the large amounts of sulphur broken down in the process of boiling. It is this, together with overcooking and faulty cooking in general, that has led so many people to declare that cooked cabbage is indigestible. Obviously, then, there are such difficulties in the way of cooking cabbage so as not to waste it, while at the same time not rendering it indigestible, that it is far better to eat it uncooked. It is one of our best salad plants and why people insist on rendering it indigestible and bad-smelling by cooking has always been a mystery to me. Never cook cabbage when it can be eaten raw. It is more nourishing and easier to digest raw. If it is old and tough, no longer crisp, then cooking is permissible. However, even old, tough, wilted cabbage may be made quite crisp by soaking the head in cold water, or wrapping in a cloth wrung from cold water and allowing to stand for a few hours. This applies to all salad plants.

Steaming is even a better way of cooking vegetables than boiling them, as only about one third of the amount of loss takes place in steaming that takes place in boiling. Steam cooking renders most foods very easy of digestion. A good steam cooker is rather expensive to buy, but will soon pay for itself in smaller fuel bills, saved labor, and prevention of food wastes. Prepare the vegetables, peeling if necessary, and put into steamer (preferably in individual dishes) and allow to remain until tender. It is advisable with most vegetables to put just a little water in the bottom of the cooking vessel in which the vegetables are steamed; this should be served with the portion of the vegetable,

drunk as a beverage, or used in soup, as recommended in discussing boiling of vegetables.

Many vegetables are delicious cooked in the oven, baked either en casserole or escalloped, and when possible they should be so cooked. Potatoes, either white or sweet, are better baked than cooked in any other way. When cooked this way, at least some of the skin should always be eaten along with the potato; before potatoes become very old, that is, before too late in the season, the entire skin may be eaten and enjoyed. And in parts where succulent vegetables are scarce it is positively imperative that the skins should be eaten to give the system enough alkaline mineral salts to maintain the alkalinity of the blood and to prevent scurvy and other diseases springing from acidosis, or "acid blood." And this, even tho it may be late in the season and the skins tough and leathery; in fact, it is at this season that it may be necessary to eat skins and all, for it is then that succulent foods are most liable to be unobtainable in many parts of the country and the need for the alkaline ash of the potatoes greatest. Spinach and other greens are very fine baked en casserole, as are also carrots and other roots. Everyone appreciates the value of properly baked beans; and escalloped potatoes are not without their virtue as a change from the other methods of cooking them.

The foregoing methods of cooking may be applied to all members of the respective classes of foods. Thus, beets, turnips, parsnips, and kohlrabi, etc., are best cooked after the manner of carrots. All greens of no matter what variety, should be cooked as above described, that is, with as little water as possible and the juice, as well as the vegetable, eaten.

However, there is one particularly tasty and healthful way of cooking carrots that I wish to mention in passing. Slice the carrots in thin, tho not too thin, circular slices and plunge into boiling milk and allow to boil until tender, which should take twenty-five to

forty minutes, and then season and serve, serving a liberal portion of the juice with each portion of the carrots. Salt and a little butter are all the seasoning required to make this the most delicious dish imaginable. Care must be observed, tho, to prevent boiling over or burning; this can be accomplished by stirring occasionally with a long handled spoon. Onions may be cooked the same way, as may other roots, and you will find them far tastier and much more nourishing than if cooked in the conventional manner, that is, cooking until nearly done in water and then draining and finishing in milk, which is objectionable because of loss of mineral salts and flavor.

Do not season foods until just about done, or, better still, let each person season his own food at the table. Succulent vegetables when cooked may be seasoned with a little salt, or with salt and any of the following: butter, olive oil, peanut oil, cotton-seed oil, "salad oil," or, with these alone without the salt. Lemon juice may be used on greens occasionally, when starches are not eaten at the same meal. Never use pepper, mustard, ketchup, chili sauce, sour pickles, etc., There is no need for them and no excuse for their use. In making soups, cut vegetables into small pieces, as this permits of more thoro extraction of the nutriment and flavor and consequently makes a richer, better flavored soup. If meat is to be used in the soup, it is better to cut it into pieces, place into plain cold water, and allow to come to a simmer and simmer until the vegetables, stewed in a separate vessel, are done, and then mix the two together just before serving. Not cooking the two together is especially desirable where the meat contains fat and there are potatoes or other starches among the vegetables, for in this case the fat is likely to coat the particles of starch rendering it almost impossible for the saliva to act on the starches, and thus delay starch digestion and bring on fermentation. This is particularly true for

those of weak starch digestion; people who are troubled with inability to manage starches well and in whom starches are liable to ferment should never cook fats and starches together, not even boiling them together, let alone frying starches in fat. Remember that frying fat renders it indigestible and hence makes everything it comes into contact with inaccessible to the action of the digestive juices.

COOKING OF MEATS—Meats may be cooked in various ways, according to the taste of the cook. Baking, or roasting, is perhaps the best of all methods of cooking meat, as it best preserves the juices and at the same time imparts to the meat the most delicious flavor. In baking it is best to start the process with a very hot oven, say a temperature of 400 degrees Fahrenheit, and then, after keeping it at this temperature long enough thoroly to sear the outside, that is, ten minutes, lower the temperature to about 250 to 275 degrees F. and bake until done enough to suit. Every ten or fifteen minutes baste the meat with its own juices, adding as much water to the liquid in the pan as may be needed, but no more. Do not salt until a few minutes before removing from oven, as cooking meat in salt toughens the meat and makes it less digestible. Keeping the oven too hot during the process likewise toughens the meat; just enough very high temperature to coagulate the albumin so as to keep in the juices at the start and then just enough heat to keep the meat cooking is all that is necessary.

Boiling meat is properly done by boiling it for not more than the first ten or fifteen minutes and then allowing the process to slow down to a simmer. First have the water boiling and then plunge the meat into it, keeping the water boiling for the first ten minutes to coagulate the albumin and keep in the juices. Boiling after this is accomplished serves only to toughen the meat; let it simmer, or stew, until done. This should take about 20 to 25 minutes for each pound

of meat; a three pound piece of meat could thus be cooked in about one hour to an hour and a half.

Very tough meats should be cooked in a steamer or a pressure cooker, not boiled; it is almost impossible to boil tough meats tender. Never soak meat in cold water, as this will extract part of the nutriment.

Broiling meat is a very tasty way of cooking certain cuts, especially where the meat is quite lean; to broil well the meat should not be cut too thick; it should be placed over, under, or in front of, the direct heat, as over or under a gas jet, or in front of or over a bed of coals, and turned from time to time to secure an even cooking; cook as long as necessary to bring to the desired state, whether rare, medium, or well done.

Steaming is one of the best ways of cooking meats, being particularly fine for old fowls and tough pieces of meat. A fireless cooker also has much to recommend it in the cooking of meats. It is convenient, cheap, and labor-saving and reliable. It is much better for cooking meats where the desire is to preserve all the flavoring than for cooking vegetables where it is in many cases necessary to allow the bad flavored gases to escape.

Frying meat. Select a piece of meat of suitable size and then—broil it! Or pan broil it, that is, fry in pan without grease. Fat, grease, is too scarce and expensive these days to waste by frying; and all kinds of foods are too scarce and expensive to spoil by frying.

Fish may be baked, boiled, or broiled and are most excellent meat substitutes cooked in any of these ways. If you must use flesh foods, use at least some fish; they are cleaner, cheaper, and more plentiful than beef, pork, or mutton.

Game may be cooked as other meats, being particularly tasty and nutritious baked, tho very good, indeed, boiled.

GRAVIES—The best gravies are the natural gravies, that is, just the meat juices without any starchy thickening added. Remember the objection to cooking other foods, especially starches, in fat!

Before leaving the subject of the cooking of meats, let me add that the average person would be far better off, physically and financially for substituting eggs, milk, beans, peas, lentils, peanuts, and nuts for meat wherever and whenever possible.

COOKING FRUITS—Let it be understood that altho recipes for cooking fruits are here given, they should whenever possible, be eaten raw. This applies where fruits have naturally ripened. Furthermore, whether eaten raw or cooked, their natural flavor should not be obscured by covering them with sugar, nutmeg, etc. They are best just as Nature made them. Eating sugar and cream on fruits is a habit that probably sprung out of the old idea that the main aim of eating was to eat as much “nourishing foods” as possible, hence to eat sugar, butter, and cream on all things that could be used as a pretext for eating these nourishing foods. Discriminating taste certainly never dictated it; what chance is there to discriminate between the taste of things whose natural flavors have been obscured! To the sugar fiend, all things must taste just alike, sweet. Such a person might just as well have none of the wonderful varieties of the seasons. There are a thousand different shades of flavor of which he knows nothing. Usually, too, such a one likes sour pickles, lots of salt on his vegetables, and tea, coffee, and beer. He comes to know but practically four flavors—sweet, sour, bitter and salty. Learn to eat fruits, not for the sugar and cream you can pile on them, but for their own individual flavors, as well as their health-giving qualities.

Dried fruits, such as dried apples, dried pears, dried peaches, and figs, raisins, prunes, and currants may be stewed, or simmered, never boiled, until they

absorb enough water to make them almost their natural size, and thus very delicious and healthful. The latter group, figs, raisins, prunes and currents, may be soaked a few hours in warm water with equally pleasing results and are then even more nearly as when picked. Learn to soak your fruits more and not cook them so much. And learn to use dried fruits more; they are much better for you than granulated sugar and much more plentiful. But whenever possible insist on having the sun-dried and not the sulphured fruits. In soaking, wash thoroly first, being careful not to break the skins, and then soak; the juice makes a healthful and delicious beverage.

SALADS—Let us understand at the outset that when we are speaking of salads in this book, we are talking about real life-size salads and not about the conventional miniature imitations usually served. Salads as ordinarily served are so small, that, were it not for their spicy dressings, one would be unable to remember fifteen minutes after a meal whether he had had salad at all. When you serve a salad (and one should be served at at least two of the three daily meals) serve one that will be large enough to comprise about one-fourth or one-third of the bulk of the entire meal. This will enable you to add infinite variety to the diet; give your teeth very beneficial and much needed exercise; prevent overeating of the more concentrated foods with its attendant waste and bodily ills; and, finally, insure the body's having an ample supply of alkaline mineral salts and the recently discovered "vitamines," known to be so necessary to perfect health and which are so easily destroyed by cooking. In making salads it is only necessary to apply the same common sense rules that are advocated in this book for the other parts of the meal and any one can make his or her own salad recipes without end to the variety possible. Simplicity should be the keynote of salad making. Use only good, clean, sound

fruits, nuts, and vegetables and such simple dressings as are mentioned below and watch the improvement in your health. Cottage cheese and fish may be used occasionally in the making of a salad, tho it is hardly wise to eat fish salads unless you know absolutely that the fish in them is fresh and sound. Choosing at random from among our many varieties of salad plants and adding a few nuts, or a little fruit, or both, let us see what fine salads can be made, and that with very little work or expense.

Grated carrots, halved grapes, and chopped celery make a salad that can hardly be surpassed and for which no dressing is needed. A few nuts may be added to this, or a little cottage cheese, if desired. Or, lettuce may be substituted for the celery in this salad. Most everyone is familiar with cabbage, apple, and celery salad, which needs no dressing at all or at most, but a little salt and oil. In fact, beside a little salt and some oil (olive, cottonseed, corn or peanut oils), very little is permissible in the way of salad dressing, except the juices of some fruits—say grape juice, orange juice, pineapple juice, grapefruit juice, or lemon or lime juice, according to the liking for sourness. However, you must keep in mind continually in making salad dressings, as at all other times, that acids and starches are not to be eaten at the same meal, and that those with stomachs already too acid should not use acid salad dressings at all, or at least not until there has been an abatement of the secretion of acid by the stomach.

Sour cream in moderation makes a good salad dressing.

Other salads are: Tomato, cucumber, and onion.

Tomato, cucumber, and celery.

Tomato, cucumber and lettuce.

Tomato, cabbage and celery.

Celery, lettuce and cabbage.

And so on ad infinitum. These are merely hints. Use two or three or four good crisp vegetables or vegetables and fruits, or vegetables, fruits and nuts, and you cannot go astray on salad making.

However, I can not pass on without recommending for trial a salad that is almost a complete meal in itself. It originated with my wife, and the many friends to whom she has recommended it have called it the "MacMickle Salad." Here it is: Equal parts of cottage cheese and grated carrots, with a liberal sprinkling of halved, seeded grapes, or soaked seedless raisins stirred in, and the whole served on lettuce. Of course when such a salad is served in good sized portions no other protein is needed at the same meal. A good fish salad is made as follows: boiled salmon, or shrimp (or other fish that you know to be in good condition) shredded and mixed with tomato and chopped celery; add mayonnaise dressing made with egg yolk, oil, lemon juice, and little salt.

Cherries, plums, berries, olives, oranges, pine-apples, grapefruit, apples, grapes, and other fruits may be used either in conjunction with vegetables, or to make a straight fruit salad. Such salads need little or no dressing.

In using bananas in a salad it will be necessary to keep in mind the rule about acids and starches; if the bananas are not dead-ripe, they should not be mixed in a salad with oranges or other acid fruits, for unripe bananas are quite starchy. There can be no such objection to so using dead-ripe bananas, tho they are not so firm as the unripe ones and therefore do not hold up as well in the salad, are more liable to be crushed and mushy. Fruit salads are particularly to be recommended eaten with meats or fish and greens.

Raisins, dates, and figs, and other dried fruits are not to be neglected as salad materials; they may be simply washed and added to the other ingredients, or they may be soaked for a few hours in warm water and

softened and swollen to almost natural size before mixing. While mentioning the sweet fruits in this connection, let me suggest that you try using them as sweetening in otherwise sour dishes, where you ordinarily use sugar. Rhubarb, for instance, is certainly very tart without any sweetening, but with a liberal sprinkling of raisins or dates, it becomes a much tastier dish than when granulated sugar is used. Strawberries likewise; also apple sauce. From a financial point of view they are at least as cheap as sugar, and from a health point of view they are far superior. In baking apples, try coring the apple and stuffing the core hole with raisins, dates, or figs, particularly if the apples are tart.

Honey is another thing that may safely be added in limited quantities to some salads, salads that seem to require a bit of sweetening. And, like the sweet fruits, it may also be used as a sweetener for the sour fruits. It is advisable in sweetening cooked fruits to add the honey after cooking and just before serving, or let each one sweeten his own dish at the table. In sweetening uncooked fruits with honey it is better to put the honey on the fruit and allow to stand for some time before serving.

CHAPTER VII

Regarding "Acid" and "Alkaline" Foods.

In the recent past there has been an increasing amount of discussion regarding so-called "acid foods" and "alkaline foods," more properly called "acid-forming" and "base-forming" foods, respectively. Much that has been said about these foods is misleading. In fact, calling them "acid foods" instead of "acid-forming" foods and "alkaline foods" instead of "base-form-

ing" foods, is itself misleading. What is really meant by these terms is, that certain foods have an acid-forming tendency and others have a base (alkaline) forming tendency—not, as some people think, that foods with a sour taste are acid-formers and foods not having a sour taste are base-formers. Whether or not a food has acid-forming properties or base-forming properties depends, not upon its taste, but upon the kind of "ash," or mineral residue, left after oxidation of the protein, fat, and carbohydrate which the food contains. This refers, of course, only to the natural properties of these foods when normally digested and assimilated. But one must never forget that these same proteins, fats, and carbohydrates can themselves break down into acid products under abnormal conditions of digestion and assimilation, regardless of the nature of their mineral content, (See chapter on "Fermentation and Putrefaction").

This brings us to a consideration of the mineral salts spoken of in the preceeding pages. If the ash contains an excess of acid-forming minerals over the amount of base-forming minerals present, then the food is truly an acid-forming food; if, on the other hand, the base-forming (or alkaline) minerals predominate in the ash, the food is a true base-former. The principal alkaline minerals are calcium (lime), magnesium, potassium, and sodium; the principal acid-forming minerals are phosphorus, chlorine and sulphur. It is not necessary that you remember the names of all these, for below are given a list of the principal acid-forming foods and alkaline, or base-forming foods.

Given in the order of their acid-forming abilities, the most common acid-formers are

Beef, free from visable fat, Eggs, Round steak, Oatmeal, Wheat flour, Wheat (entire grain), Rice, Bacon, Corn.

Other foods that are acid-formers are, other kinds of meat, cereals in general, and fish. The whites of eggs are richer in acid-forming minerals than the yolks.

Naturally anyone eating much of these acid-forming foods will need to eat a good deal of the base-formers in order to keep the blood alkaline and thus prevent "acidosis," or an acid condition of the blood and weakening of the alkalinity of the body's alkaline fluids in general. Following are some of the richest base-forming foods, given in the order of their base-forming strength:

Celery, Cabbage, Potatoes, Prunes, Turnips, Apples, Milk, Beans, Peas.

Notice that, with the exception of milk, all the foods here named are vegetable foods, and that, with the exception of potatoes and peas and beans, these are succulent foods. In fact, all succulent foods are base-forming, hence their importance in the diet. In preparing these foods for the table be sure to keep in mind the principles outlined in the chapter on cooking, otherwise you will lose most of the valuable salts possessed by these foods.

Here a special word regarding the cooking of beans may not be out of order. In cooking beans in the regular way, that is, parboiling in soda and then recooking in fresh water, much of the alkaline salt is lost. If you would prevent this loss of the minerals, wash the beans thoroly and put into fresh, clean water and allow to soak over night. In the morning put on to cook in the same water and allow to cook until done and then pour into baking bowl and put into oven and bake to suit taste. Thus none of the food value of the beans is lost and in seasons when fresh fruits and vegetables are scarce, or impossible to obtain, the alkaline salts thus saved will go far toward preventing acidosis.

Regarding the base-forming qualities of acid fruits, many people are puzzled how this can be

so. Naturally one wonders how, when a food is acid, it can have the ability to keep the system alkaline. Prof. Sherman, of Columbia University, New York, explains this very nicely. He points out that the fact "that even the strongly acid fruits should yield an excess of bases on oxidation depends upon the fact that the acidity of the fruit is due to an organic acid" (an organic acid, not an inorganic acid, mind you) and explains that this acid when burned (oxidized) leaves an alkaline ash. Hence, you can see why these fruits are so useful in curing the various diseases caused by acidosis. I mention this because patients frequently ask me why, if they have acidosis, I give them acid fruits, and why these invariably cure their ailments.

However, I sometimes find that people with excessively acid stomachs are better off for temporarily abstaining from all acid fruits, eating only the vegetables and non-acid fruits, until there is an abatement in the secretion of hydrochloric acid in their stomachs. For, where one already has too much acid secretion in the stomach, even the organic acids of fruits are liable to be very irritating and thus aggravate the condition, instead of helping it. Particularly is this liable to be true at first, tho as the blood and entire system once more become normally alkaline this tendency disappears. The reason for this irritating effect of acid fruits on acid stomachs is, that, while the acid is later oxidized and leaves an alkaline ash, this oxidation does not take place while the acid is in the stomach, so the acid of the fruit still remains an acid while in the stomach and can't help irritating it. Hence, celery, cabbage, potatoes, turnips, and milk, are far better to begin with in cases of acid stomach than the acid fruits. From the foregoing it should be plain to the reader, that if one has acidosis in any form, he should leave out all acid-forming foods and make his dietary entirely from the base-formers.

CHAPTER VIII.

Iron, Lime, Phosphorus, and Sulphur.

No treatment of this subject of minerals would be complete without a discussion of iron, lime, phosphorus, and sulphur in their especial bearing on the health. These minerals in particular call for consideration, both because of their own importance and because of the fact that where they are adequately supplied there will be no lack of the other minerals before mentioned. For the benefit of those who, for special reasons, need consciously to select foods rich in these elements, I will give herewith lists of food that contain most of each of these elements. These lists will name such foods in the order of their richness in each respective element; thus the foods richest in iron will be given under the heading "Foods Rich in Iron" with one containing most iron given first, the one containing second most iron, second, and so on. The same for lime, phosphorus and sulphur.

IRON—To give an adequate idea of the importance of this element in the dietary would require a book larger than this one; but let it suffice to say here that its importance is so great that without any of it one would soon die. You will understand this when you realize that it is the iron in the red corpuscles of the blood that enables them to absorb the oxygen from the air in the passage of the blood thru the lungs and to carry this oxygen to all parts of the body and yield it up wherever most needed. Without iron you could have no red corpuscles and without these you would die of oxygen starvation even if you were surrounded by pure oxygen. People who have insufficient iron are said to be anemic, that is lacking in red blood corpuscles, and one of the most distressing symptoms is shortness of breath and consequent lack of endurance, due to the inability of their blood to carry enough oxygen to meet

the body's demand. That this is an exceedingly prevalent condition is evidenced by the popularity of the so-called "tonics" and "iron medicines," which, by the way, are extremely likely to be found to have no connection with iron—unless it be with the iron hearts of the conscienceless quacks who manufacture them, or, if they contain any at all, contain it in a form that the body cannot use. There is not a so-called "iron medicine" on the market today that is not an unmitigated fake, all their advertisements to the contrary notwithstanding. Not a single one has even the remotest possibility of doing an anemic person the slightest good; yet despite the fact that every last one of them has been shown to be humbug, pure and simple, they continue to exact toll from hosts of sufferers from anemia. The fact that hundreds of thousands of dollars are spent annually for these quack remedies, especially the better advertised ones, would seem to prove that there must be many people suffering from insufficient iron in their blood. But why do they continue to buy these fake medicines when they can do them no possible good and may do them much harm? They buy them for the same reason that they become anemic in the first place; they do not know where to get iron in a form that can be used by the body to make good red blood.

There is just one source of this kind of iron and that is in foods where iron exists in a form that can be appropriated by the body and used for good blood-building. There is no other way to get iron that is of any use to the body. But so long as we persist in throwing away four-fifths of all the iron in wheat (and other cereal grains) when we mill it into "fine" white flour, and cook most of it out of our vegetables and throw it away because of the faulty methods of cooking conventionally used, just so long will we continue to turn to magic patent medicines to make up the deficiency which we suffer as a consequence. Use the

iron-containing foods that Nature has supplied so abundantly and use them in as nearly their natural form as possible, that is, don't mill out, or boil out, and throw away the iron which they contain, and you will have no need to worry about being anemic. Even the prostituted recommendations of a champion prize-fighter will have no interest for you.

The following foods, given in the order of their iron content, contain the greatest percentages of iron of all foods:

Lentils, Egg yolk, Beans dried white and lima, Peas dried, Wheat entire grain, Raisins, Rye entire grain, Hazelnuts, Barley entire grain, Oatmeal, Spinach, Figs dried, Dates, Prunes dried, Olives.

Meat on the average is the richest in iron of all foods, but experiments tend to prove that the iron of meat is not well utilized by the body—probably because it has already been partially metabolized (used up) by the body functions of the animal, and largely because most of it is found in the blood of the animal and is consequently lost in killing and dressing.

While the above are the fifteen food richest in iron, that is, containing the greatest percentages of iron, yet it is well to bear in mind that for the most part they are very concentrated foods, in fact, all except spinach. Being of such high fuel value, it is not well to depend upon these as the sole source of iron supply, especially for the sedentarily employed and all others who don't need a fairly large fuel supply. For the sedentary and inactive, the following list is far better to choose from for iron. These are given in the order of their richness in iron in proportion to their total fuel value and because their total fuel value is low, the proportion of iron is high. Hence, they are a much better source of iron for the inactive and sedentary than the above named foods. They are:

Spinach, Lettuce, Asparagus, String Beans, Cabbage, Celery, Strawberries, Radishes, Tomatoes,

Squash, Fresh Peas, Carrots, Potatoes, Huckleberries, Grapes.

Other foods quite rich in iron are: Beets, turnips, cranberries, onions, pineapples, dandelion greens and fresh lima beans. Dried sweet corn, walnuts, almonds, and peanuts, tho belonging to the heavier, or more concentrated group of foods, are also quite rich in iron.

From the foregoing, then, it would appear that anyone whose diet contains a liberal allowance of the greens and salad plants above named and some whole grain foods, together with the legumes, and the dried fruits and nuts would not be liable to iron shortage and consequent anemia. It is well to bear in mind that while many people are suffering from a lack of iron, it is impossible to get too much food iron. If you eat more food iron than the body needs, any excess over the body's ability to store it will simply be passed out and no harm done. On the other hand, you will be insuring yourself against the possibility of a lack of it, you will be taking a real health insurance. So far as any excess of iron is concerned, the reverse is more likely to be true of the average American dietary.

Prof. Sherman, one of America's greatest authorities on foods and nutrition, particularly emphasizes the necessity of allowing ourselves a liberal allowance of food iron. He says: "The typical American dietary does not contain any such surplus of iron as would justify the usual practice of leaving the supply of this element to chance. The available data rather indicate that foods should be selected with some reference to the kinds and amounts of iron compounds which they contain." Regarding the losses of iron in milling wheat, he says: "Iron, is found in considerable quantity in the cereal grains, but the greater part of it is in the germ and outer layers and so is rejected in the making of the 'finer' mill products, such as patented flour, polished rice, and new-process corn meal."

Very evidently, then, a list of the iron containing foods, such as is given above, can prove very useful not only to the sick, but to the well. And I recommend, first, the eating of at least one of these iron foods at every meal; second, eating such foods raw whenever possible; third, always eating the juices of these vegetables when cooked; and fourth, chewing these, as well as all other foods, very thoroly, so that the body may easily digest and absorb every bit of their iron content. Young spinach, lettuce, celery, tender asparagus tips, cabbage, strawberries, yolk of egg, tomatoes, etc., can all be eaten raw and with great advantage. The tender vegetables, taken either alone, or mixed with other vegetables, make very delicious salads, which, if chewed thoroly will be readily assimilated and will build good red blood.

LIME—The importance of this element is not fully realized even by many dietitians, but when you know that it not only constitutes the greatest part of the bones, but that it also enables the heart to contract and that without it the blood could not coagulate and one would bleed to death from comparatively simple wounds, you begin to grasp its importance. So important is it that animals will do almost anything to get it; carnivorous animals will even eat vegetables to get lime, if fed plain meat without any bone; for, says Sherman, "No animal is literally carnivorous in nature, that is, none lives on flesh alone; the animals called carnivora always eat more or less of the bones of their prey." Calcium salts are also necessary to the contractility, or ability to contract, of the muscles in general, as well as of the heart muscles. In the light of this, then, it is easy to see the necessity of having a fairly liberal supply of this element in the dietaries of people of all ages, and particularly of growing youngsters. Necessary as it is for adults, children positively must have a liberal supply of it. Prof. Sherman tells us that the average American dietary is lacking in this

element and says, "Apparently there should be more attention to the choice of such foods as will increase the calcium content of the dietary." Bunge, Meltzer, and other investigators agree with Prof. Sherman in this. We must begin consciously choosing our foods with the idea of increasing our calcium allowance, particularly where there are children to be considered. Here is a list of the fifteen foods richest in lime given in order of their richness, based on the percentage of calcium in the edible portion:

Cheese hard, Molasses, Mustard, Turnip tops, Cottage cheese, Almonds, Dried figs, Water cress, Rye bran, Dried beans, Egg yolk, Chives, Cow peas, Cauliflower, Milk.

Other foods rich in lime are: Celery, buttermilk, spinach, lettuce, rhubarb, leeks, turnips, cabbage, and rutabagas.

Speaking of the quantity of lime in milk, Prof. Sherman points out that there is as much lime in one and one-fourth pounds of milk as in more than ten pounds of round steak, or eight pounds of good grade white bread, or in four pounds of bread and six pounds of steak. He then says: "The fruits and vegetables generally are fairly rich in calcium, and some of the green vegetables strikingly so; but in most cases the the intake of calcium depends mainly upon the extent to which milk (and its products, other than butter) enters into the dietary. A quart of milk contains rather more lime than a quart of clear saturated lime water, and by far the most practical means of insuring an abundance of lime in the dietary is to use milk freely as a food."

People who, for one reason or another, need to avoid an excess of lime, as well as people who want to increase the lime supply of their dietaries will find the above table of lime foods invaluable. Naturally, this would apply to old people who do not need more lime for bone building, or but very little at most, and

to growing children who do need lots of bonebuilding material. On this point, Bunge, an investigator, says: "Calcium more than any other inorganic element is likely to be deficient as the result of the change in diet from mother's milk to other forms of food." Obviously, then, Prof. Sherman's recommendation to use cow's milk is particularly applicable to children.

PHOSPHORUS—Because of its functions in bonebuilding and in the fluids of the body and because, as one investigator points out, "A comparison of the amounts of phosphorus contained in the food of typical American dietaries with the amounts metabolized (used by the body) indicates that a freely chosen diet does not always furnish an abundance of phosphorus compounds," I have deemed it necessary to furnish a list of foods rich in this element for your guidance. Again, phosphorus is perhaps more important to the young and growing than to the adult or aged, as it is quite necessary to the building of a good, vigorous bony frame-work. However, it is absolutely necessary to the muscles and the brain and nerves, even tho to a less extent than in the bones; so its importance for all cannot be overlooked. In fact, Sherman regards it as being equally as essential as protein and thinks that many of the ill effects attributed to a low protein diet by the advocates of a high protein diet are rather due to a lack of phosphorus. You will remember that the consensus of opinion among the majority of investigators is now in favor of a low protein diet. He says: "The phosphorus compounds are as universally distributed in the body and as strictly essential to every living cell as are the proteins. It appears probable that much malnutrition attributed to low protein diet is really due to deficiency of phosphorus (and possibly calcium also) in the food."

The following are our foods richest in this element:

Rye bran, Wheat bran, Cheese hard, Beans dried, Mustard, Egg yolk, Cow peas, Barley entire grain,

Peas dried, Wheat entire grain, Peanuts, Oatmeal, Almonds, Rye entire grain, Sweet corn dried.

Note that with the exception of rye, bran, wheat bran, and mustard, they are all quite concentrated foods, mostly cereal grains and legumes.

The kinds of phosphorus compounds found in grains and legumes are called "phytates" and one authority says of them, "Considering the quantities in which they occur in grains and other vegetable foods, the phytates must be regarded as one of the most important dietetic sources of phosphorus." He further says: "It is interesting to note that the phosphorus of wheat bran is mainly in the form of phytates, which are easily extracted and doubtless readily absorbed from the digestive tract." He then states a very interesting fact, namely: "Washed wheat bran fed to cows was found to be constipating, indicating that the laxative property of ordinary bran and whole wheat products is dependent not simply upon mechanical irritation, but largely, if not mainly, upon the phytates."

The phosphorus found in egg yolks, milk, and cheese are referred to as phosphorized fats and "these occur in large quantities in brain and nerve substance."

However, the question again raises itself, as with regard to the other minerals, how to get enough of this valuable element without eating too much food of high fuel value. Again the solution is the same—the fresh vegetables, together with bran, both rye and wheat, and other foods of high fuel value.

Here are some foods low in fuel value and rich in phosphorus: Buttermilk, celery, spinach, mushrooms, lettuce, cauliflower, cucumbers, leeks, pumpkins, and asparagus. These should of course, furnish the chief phosphorus supply in the dietaries of those not actively engaged in muscular work, nor exposed to extreme cold, hence, needing but little fuel food. Chocolate and cocoa are quite rich in phosphorus, but

their use cannot be recommended, especially for children, so they are not given in the above list. Likewise fish and meat are quite rich in phosphorus, but as Sherman says, "the phosphorus exists (at least after cooking) so largely in the form of simple phosphates that it possibly should not be considered as of equal value with the phosphorus of other foods." He then sums up by saying, "In general therefore, the most practicable and economic method of securing an abundance of phosphorus in suitable forms is in the free use of milk, eggs, vegetables, and such cereal products and breadstuffs as contain at least a part of the outer layers as well as of the inner portion of the grains.

SODIUM, MAGNESIUM, and POTASSIUM—These elements, while equally as important, each in its way, as those already dealt with, need not be mentioned at length here. For, when the body's requirements of the other minerals are met, there will be no lack of these three. Here it will be sufficient for us to know that an abundance of sodium is needed in the blood and other fluids of the body and to a less extent in the tissues; that magnesium enters largely into the formation of the bones; and that potassium occurs mostly in the soft tissues, in the corpuscles of the blood, in the protoplasm of the muscles, and in such highly specialized glandular secretions as milk. These all abound in vegetables, fruits, nuts, legumes, and the cereal grains, that is, the whole grains, not such emasculated products as white flour, new-process corn meal, and polished rice. All three of these minerals, as well as lime, already so thoroly dealt with, are alkaline and important factors in keeping the body normally alkaline.

In addition to these might also be mentioned chlorine, found in most foods, whose chief usefulness to the body is to help form the hydrochloric acid of the stomach. Chlorine is an acid-forming material, and some of it is needed, yet the general tendency

is to run to an excess rather than the opposite, especially is this true of those who use table salt so copiously. This is, as you remember, a compound of sodium and chlorine and is called by the chemist, sodium chloride. And since there has been of recent years a great deal of dispute as to the propriety of the use of salt, let us see what Bunge, who carried on a series of investigation along this line, has to say. He concludes that while one might live without the addition of salt to the food even on a diet largely vegetarian, yet without salt we should have a strong disinclination to eat much of the vegetables rich in potassium, such as potatoes. Says he, "the use of salt enables us to employ a greater variety of the world's products as food than we could do without it." However, "we are accustomed to take far too much salt with our viands. Salt is not only an aliment, it is also a condiment and easily lends itself, as all such things do, to abuse." Sherman also thinks we eat far too much salt and says that less than one-fourth of what we ordinarily eat would be plenty to keep us in health. To assert, as some writers on diet have asserted, that salt is not needed and that it is injurious is to make claims not supported by the available evidence, but rather based upon pet theory. Many, if not most, vegetarian animals eat some salt and, like man, would probably take a lot more if they could obtain it. Man is not the only animal that lets his appetite for such things get the better of him; many animals would eat more salt than is good for them if they got the chance. Some animals seem to get along on but very little. Carnivorous animals show decidedly less craving for salt than herbivorous animals, probably because they get all they need from the flesh of their herbivorous prey. But there is no argument from nature why man should not use some salt, living on a mixed and often largely vegetarian diet as he does. In fact certain chemical processes taking place in the body are at least accelerated, if not actually brot about,

by salt. For this so little is necessary that what we eat in comparison with what we need may have led some writers to assert that we need none.

SULPHUR—This element calls for particular mention not because there is liable to be any shortage of it in the average dietary, but because there may be trouble from an excess of it, particularly in its cooked form, in which condition it may and frequently does cause the formation of gas in the intestines. Especially is it liable to cause gas in the intestines when eaten in foods that are improperly cooked. Eaten in the form found in raw foods, it seldom gives any such trouble. Mention was made of this in the chapter on cooking in dealing with cauliflower and the cabbage family. The heat required in cooking seems to render the sulphur of some foods peculiarly likely to form gas. This is probably brot about by the decomposition, the breaking down, of the organic compound containing the sulphur from the effects of the heat used in cooking. This formation of gas must be prevented in the sick, especially those suffering from digestive disturbances and nervous derangements and anemia. It accentuates already existing digestive troubles; it irritates and aggravates nervous disturbances; and it prevents absorption of the food iron by the anemic. Nor is it good for the well to be going around continually inflated with hydrogen sulphid, or some other volatile sulphur compound; they won't long remain well if they do. On the other hand, the sulphur compounds of some foods seem not to cause this trouble and may at times even prove a very good laxative. Thus, that in wheat bran and in raw cabbage has decidedly laxative virtues.

Foods containing sulphur compounds that seem to cause intestinal gas are: Egg whites, horseradish, had-dock and pike and some other fish, cauliflower, leeks, onions, turnips and turnip tops, cucumbers, radishes, veal, frog's flesh, raw peanuts, dried beans (when improperly cooked) and rye. Not all these foods cause

gas in everyone, especially if properly cooked, but some of them will cause gas in some people, no matter how well cooked. It seems to be to a certain extent dependent upon personal idiosyncrasy. If you find that any of the above foods forms gas in your intestines, let it alone or try it prepared in a different way.

In thus avoiding these sulphur containing foods you are in no great danger of suffering from a lack of this element, for it is found in all proteins, and the body's need of it is so small that when the protein supply is sufficient the sulphur supply is also sufficient. One of the interesting facts in this connection is that when proteins are oxidized in the body, their sulphur becomes converted for the most part into sulphuric acid, which, of course, must be neutralized as rapidly as it is formed, since free sulphuric acid even in weak concentration would be very injurious to the cells. This neutralization is brought about principally by the sodium previously mentioned, the sodium being a base and the sulphur an acid-former.

Having thus discussed the various mineral salts generally and quite in detail, I can perhaps best impress upon you the vital importance of these by quoting from an article by a competent writer in an authoritative medical journal. He says: "Up to a very recent time text-books on physiology taught the budding physician that the three chief foods of men were proteins, fats, and carbohydrates, which were treated at some length by the author. Tucked snugly beneath these, the mineral salts received a bare mention, the author explaining that little or nothing was known of their action in physiology.

"The fact is that proteins, fats, and carbohydrates are **not** the three chief foods of man. The chief foods of man are air, water and the mineral salts." Further, he says, "That these are absolutely essential to life is shown by the fact that animals die after a short time when fed on a food deprived of its mineral salts."

Again, "These important mineral salts are found in their best condition and most assimilable form in the vegetable kingdom, where in the fruits and vegetables they lie most abundantly just under the skin. They are removed by thick paring, soaking in water after paring, boiling in quantities of water which dissolves them and then draining the valuable solution down the sink." And still further, "If we had a well-balanced ration, properly cooked, so that the essential mineral salts would remain to be assimilated, there would be little or none of that deficiency in the composition of the blood which invites disease."

To conclude this subject, let us quote from Dr. Horace Packard's very interesting article, "Demineralized Food and Cancer" (Boston Medical and Surgical Journal, March 31, 1912). After speaking of the almost universal use of white bread with its lack of mineral salts among most of the civilized peoples of the world, he points out that there are still communities so isolated that "the material for making bread which is white does not reach them," or in but very small quantities and says, "The interesting and impressive thing about these people is that they do not have cancer, or, if at all, to so slight a degree that it is a negligible quantity. Those people who inhabit the tropical portions of the earth, furnished by Nature with a bountiful food-supply of fruits and vegetables, rich in the food salts, and which are consumed mostly without cooking, are cancer-free, or, if afflicted at all, in so slight a degree that it is a negligible quantity. Turning now to the temperate zone: Along this belt of the earth are the nations which have reached the highest type of civilization, and it is strictly among these people that cancer has steadily augmented until it has reached proportions which constitute a scourge."

Whether demineralized food is or is not entirely responsible for cancer, there is no doubt among those competent to form an opinion that such food is largely

responsible for many, if not most of our so-called degenerative diseases. Pay conscious attention to this subject of minerals salts in your food selections and preparations and avoid any possibilities on this score.

CHAPTER IX.

The Why of the Rules.

In the beginning of this book you were promised that a discussion of the reasons underlying the rules would follow the rules laid down for your guidance. People are no longer satisfied with a mere statement that a thing is or is not so. They demand the facts on which statements are based. This is true not only of things in general, but of questions of health in particular, and more particularly still of questions of diet. It is a good tendency and one that should be cultivated. I always encourage it on the diet question. For, if once people know the facts underlying the rules of diet, as outlined in this book, the rules themselves will appear so logical and inescapable that they cannot be forgotten. Nor will one well-grounded in the fundamental principles of the chemistry of foods and the physiology and chemistry of nutrition here given ever need be puzzled by the conflicting theories so frequently met with in the literature of diet, for such a one will be in a position to examine any dietetic theory and determine its truth or falsity.

What follows, as well as what has preceded, is based upon the works, experiments, and investigations of such men as Professors Langworthy and Atwater, and other U. S. experts, and Professor Sherman, of Columbia University, Professor Russel Chittenden, and other men of national and international standing in the

field of physiology and allied branches. Howell, Cannon, Starling, and others have been drawn upon for the facts of the physiology and chemistry of nutrition which follow.

MOUTH DIGESTION—A wise old doctor once told a “dyspeptic” patient whom he had observed eating and who was berating his stomach, “Your stomach would be all right but for the indigestion of the mouth from which you are suffering.” There are plenty of people who do not know that digestion, or indigestion, begins in the mouth, that is, granting that the food has been properly prepared before serving, prepared as prescribed in the preceding pages of this book.

There are two factors in mouth digestion, viz., the mechanical and the chemical factors. The first consists in the use of the teeth in dividing and subdividing the food into the smallest possible particles. This can only be accomplished by a vigorous use of the jaws. To chew thoroly and efficiently it is necessary not only to work the jaws up and down, but to a still greater extent sideways and to some extent forwards and backwards also. If you would get a first class idea of the proper manner of chewing watch the cow. Note the side to side motion, or lateral bite, as it is called, as that is the most important part of proper mastication and one that is all too frequently neglected by many people.

This method of chewing will accomplish two things: First it will render the food so fine as to make it easy for the digestive juices, including the saliva, to act upon it; and second, it will stimulate the flow of saliva itself. Also, it will allow the saliva a longer time in which to act upon the food.

The second factor in mouth digestion, the chemical factor, consists in the conversion of starches into dextrins and of both starches and dextrins into maltose. A little explanation: The first step in the digestion of starches is their conversion into dextrins, which

are then converted into maltose, which is, in turn, converted into glucose (grape sugar) in the small intestines, and is then ready for absorption into the blood and use by the body for its energy. Dextrins are intermediate between starch and maltose and may be produced from starch by the action of heat, as in making toast, or by the action of ferments (or enzymes), as in malting grain. If the malting process is allowed to continue, the dextrins are converted into maltose. Now the saliva also contains an enzyme, known as ptyalin, which has the power to convert starches into dextrins and, if given time, to convert both starches and dextrins into maltose. Its power of doing this is truly wonderful, for it can convert many times its own weight of starch into maltose under proper conditions, such as furnished by the mouth in normal mastication.

Hence, you can see the very great importance of proper mastication. For, not only is all the food then rendered much easier of digestion for the stomach and intestines, but a good part of the digestion of starches is already done before they ever reach the intestines, which is as it should be. And another thing, this will result in such a thoro digestion of the food and such a complete absorption of its contained nutriment that not nearly so much food will be needed.

STOMACH DIGESTION—When food that has been properly mouth-treated, has had proper mouth digestion, reaches the stomach it gets somewhat different treatment. Saliva is alkaline, but gastric juice is acid. The enzyme, ptyalin, can act only in an alkaline medium; the enzyme pepsin, found in the stomach, acts in an acid medium. There is also still another difference, the saliva attacks only starches and dextrins, while the gastric juice attacks principally proteins and, to a very limited extent, fats, but no starches or other carbohydrates.

To describe it briefly and untechnically, the stomach is divided into three regions, both as regards its muscular functions and as regards its secretions. When food passes down the gullet, it drops into the main part of the stomach, known as the body of the stomach, or, technically, the "fundus." The secretion here is neutral, or, according to Howell, even slightly alkaline. As the food enters the body (or fundus) of the stomach, which we shall call "the first part" for convenience, it forms in concentric layers. That is, what comes first forms a layer next to the stomach walls, what comes next forms a layer inside the first layer, what comes next forms a layer inside the preceding layer, and so on, each successive quantity of food forming a layer just inside the layer that preceded it, until the meal is finished or the stomach is full. During the entrance of food this first part of the stomach does practically nothing in a muscular way except to expand and make more room for food that is continually pouring into it while the meal is in progress. Then, in twenty to thirty minutes, it begins slowly contracting and thus gradually but steadily forces a part of the food, particularly the more liquid portions of it, into the "middle region," which we shall here refer to as "the second part." This contraction of the first part and the consequent forcing forward of its contents into the middle or second part continues until all the food has finally been forced onward into the second part, which may take two hours or more. Here in the "second part," there is a very heavy secretion, rich both in acid (hydrochloric acid) and pepsin. And here also there is a great deal more motion than in the first part. A series of wave-like muscular constrictions attends to the thoro mixing of the food with the acid and pepsin and finally forces it forward into the third part (technically called the "pyloric part").

In this third part, which secretes but little, if any acid, but a great deal of pepsin, the food is indeed

thoroly "churned." It is forced forward and backward time and time again until it becomes very thoroly mixed and acidified and it is then literally squirted into the first part of the small intestine, called the duodenum, of which you will hear more later. This squirting is brot about by the constriction of the muscles behind the food and the opening of a little muscular valve in the end of the stomach. This valve opens only when the food has been thoroly acidified, that is, when there is more acid in the mixture than will chemically combine with the food, and closes when the acid comes into contact with the intestinal lining. So that not much food passes from the stomach to the intestines at a time—at least not during the early stages of digestion, tho later, toward the end of the process, the valve opens up and lets the residue, even quite large pieces, pass thru.

Now, in view of the fact that the food rests in the first of the stomach, where the secretion is either neutral or even slightly alkaline, for from twenty to thirty minutes before it moves onward into contact with any acid, and in view of the fact that it may take as long as two hours or more before the last of the food finally comes into contact with the acid, you can easily see that salivary digestion does not stop as soon as food reaches the stomach, but may continue for from twenty or thirty minutes on the outside of the food mass to two hours or more on the inside of the mass. Hence you can realize the very great importance of Fletcherizing—of thoroly chewing and insalivating your food. This fact also explains "the why" of the rule against combining starches and acids at the same meal. For, if the two are eaten at the same meal so that the acid can seep down thru or premeate the entire mass of food as it lies in the first part of the stomach, the alkalinity of the saliva will be all too prematurely neutralized and the action of the ptyalin stopped and itself destroyed. Thus starch digestion will be prevented until the

food has reached the intestines and during the meantime, when the starch might have been digesting, it will have plenty of opportunity to lie in the stomach and ferment and cause gas and all the other ills arising from starch fermentation. The reason for not frying starches, or any other foods, in fat, as we have already seen, is that the fat is rendered indigestible in frying and hence renders every particle of food with which it comes into contact indigestible also. But why should frying render fat indigestible and boiling not so effect it? Simply because in boiling in water the temperature cannot rise above the boiling point and this does not change the chemical nature of the fat, while in frying the temperature is sure to be above the boiling point and may go to several hundred degrees, which does result in a chemical change in the fat that renders it not only indigestible but highly irritating to the mucous lining of the whole digestive tract. Hence, frying is not only wasteful of fat, it is wasteful of the food that is fried in the fat—and highly injurious. Don't fry anything!

Tho the rule against combining two or more concentrated foods at the same meal was discussed briefly in the chapter on rules, yet it is of so much importance, particularly to those of sedentary lives, who are neither subject to actual physical exertion nor exposed to extreme cold nor inclement weather, that we shall discuss it more fully here.

To begin with, a concentrated food might be defined as one containing much nutriment in little bulk. A food that is nearly all nourishment and contains but little or no waste, water, or indigestible residue is a concentrated food. Such foods will yield many more calories, or heat units per pound than foods that contain considerable water and indigestible refuse. Anyone can understand why sugar with it 1800 calories per pound should be called a concentrated food, while lettuce with 90 calories per pound would be anything

but a concentrated food. One contains absolutely no waste or water, the other, 94.7 per cent water. It would require 20 pounds of the latter to give the same fuel value that can be gotten from one pound of the former. Plainly then, a food which yields 20 times as many calories per pound as another is a concentrated food. Likewise, in deciding whether a food is a concentrated protein food, it is easily seen that full cream cheese with 25 per cent protein is a much more concentrated protein food than whole milk with but 3.3 per cent protein. Similarly for fats, a food like peanut butter containing about 47 per cent fat is much more concentrated in fat than a food like apricots which contain but 1 per cent. But whether a food be rich in carbohydrates, protein, or fat, it is a concentrated food and very high in fuel value, tho the last is $2\frac{1}{2}$ times as high in fuel value as the two former. Hence, eating two or more concentrated foods at the same meal and eating, as many of us do, all we want, which is frequently all we can hold, at each meal, we are absolutely sure to get too much fuel—too much concentrated food and too little indigestible residue.

This is very unhealthful, first, because we have no need of so much fuel, and second, because our digestive apparatus is not adapted to handling so much concentrated food. It might help you to grasp this by pointing out a few interesting comparisons between modern man and his historic ancestor. In the first place, according to all the authorities whom I have consulted there is absolutely no evidence to show that primitive man had any larger food capacity than has modern man. Certain it is that his food supply was not nearly as constant; he ate when he could and probably all he could, but it is extremely doubtful if he had regular meals daily. In fact, it is almost impossible that he should have had three meals daily as a regular thing, for his food supply was too limited for that, except perhaps during the summer and early fall when fruits

and nuts were plentiful. For the rest of his diet he must have depended largely upon the fruits of the chase and such fish as he was able to catch; in view of his primitive means of obtaining either fish or game it is extremely doubtful if his larder could have maintained a three-meal-a-day program regularly. And probably the only foods he ate that were as concentrated as those we eat today were the nuts and the meats. Aside from these his diet consisted almost entirely of the bulky vegetables and the juicy fruits and berries and such roots as he found edible. Further, it must be remembered that in the pre-agricultural days in which he lived, this primitive ancestor, whose food capacity was so like our own, had none of the cultivated vegetables that we have today. Bulky and fibrous and coarse as some of our vegetables are, those that he had to eat were probably much more bulky, fibrous, and coarse. So it is certain that we have foods of a concentration never dreamed of by our remote forebears and that we eat much oftener and more regularly than they did. Now, as a matter of fact the digestive system that we possess and that so resembles that of our ape-like progenitors, was evolved and handed down to us hereditarily. It has, as said before, changed but little, if any. And it is still better adapted to handling more of the bulky rather than so much of the concentrated foods. Hence, a diet composed largely or exclusively of such concentrated foods as bread, meat, pies, cakes, puddings, and other concentrated foods, with greens, salads, and juicy fruits constituting but a minor portion, a diet such as is so often followed by those who can afford it, cannot but prove injurious to the digestive apparatus. Such a diet is responsible for most of our digestive ills and all the host of resultant ailments, such as colds, catarrh, rheumatism and so on, ad nauseam. If primitive man got along so well with so little concentrated food, modern man, with his warm clothes and sheltered life,

does not need anything like the amounts of concentrated foods that he eats. Hence, the rule against eating more than one concentrated food at a meal has double justification. And so far as the sedentarily employed are concerned, I consider that the perfect dietetic arrangement for them is to eat no breakfast, or one composed solely of the juicy fruits; to eat a luncheon at least two-thirds of which should consist of foods of the succulent class and the other third of concentrated proteins with, or without, a little fat, or, concentrated starch with, or without, a little fat; and a dinner constructed after the same manner as the luncheon.

And here, since we have just been discussing concentrated foods, a few remarks regarding how many calories a food must yield per pound before it can be called a concentrated food may not be amiss. Necessarily any standard must be more or less arbitrary, but I believe personally that any food yielding more than 500 calories per pound should be considered concentrated. Naturally also, of the concentrated foods some are much more concentrated than others. Thus lard with its more than 4000 calories to the pound is more concentrated than eggs with 635; but both are, from my point of view, concentrated foods. And here, by the way, is the chief value to the average person of tables of caloric values of foods and their percentages of protein, fat, and carbohydrates; such tables enable you to tell which foods are concentrated and whether their concentration is in the form of protein, fat, or carbohydrate or all three. For example, if a food yields 1500 calories per pound, 70 per cent in carbohydrates, then it is easy to see that that food is a concentrated carbohydrate. Cake would be an easy example of such a food. If, on the other hand, a food of high caloric value contain the greater percentage of its nutriment in the form of protein, then that food is a concentrated

protein. Steak would be such a food. Likewise a food of high caloric value whose greater percentage was fat would be called a concentrated fat. Butter would be an example. And, finally, when you find a food containing, say, 2,560 calories of which 25 per cent are in the form of protein, 38 per cent in the form of fat, and 24 per cent in the form of carbohydrates, you have a food that is at the same time a concentrated protein, a concentrated fat, and a concentrated carbohydrate. The humble peanut is an example of such a food. So, in this respect, a table giving the caloric values and the percentages of the various kinds of nutrients in the different foods is very valuable to the student of dietetics. The best work of this kind with which the author is acquainted is Bulletin No. 28, "The Chemical Composition of American Food Materials"—by Professor Atwater and Bryant and for sale by the Superintendent of Public Documents, Washington, D. C., for the sum of ten cents in money, not stamps. Get it and study it. Among other things this bulletin will help you to economize. For, if you turn to it and find that two foods are of practically the same fuel value and about the same composition, naturally it will be more economical to buy the one that costs the less. Thus you will often be able to get more food for a given sum of money than you would otherwise obtain. However, it must be born in mind that the number of calories furnished by a food is not the only criterion of the value of that food. Nor is ease of digestion the main criterion. For a food may be of very high caloric value, sell for very little money, and also be very easily digested and yet not make a good article of food as a steady diet. One pound of sugar, for instance, with its 1800 calories, would furnish enough food, measured solely by calories, for a day's rations for a man who was not too actively engaged in muscular work, and in very easily digested form, for the small sum of only ten cents at present prices.

But, of course, one would soon starve to death on an exclusive sugar diet, regardless of its cheapness and digestibility, even tho he ate five pounds daily. So you can see that while calories are useful in a limited way in enabling you to determine which foods offer the most fuel for the least money, yet to judge the value of a food only by its calories is almost sure to lead to an unbalanced diet. Its relative amounts of protein, fat, carbohydrates, and mineral salts must also be taken into consideration.

But, as for trying to figure out to the exact calory how much food you are eating and how much you actually need, forget it. You can't do it and do anything else! Different methods of preparation affect the caloric value of a food; different capabilities of digestion must be considered in determining how much value the body actually gets out of a given food, and a number of other factors and circumstances beyond your ability to determine, affect the reckoning. Don't bother with it. Eat according to the rules laid down, chew your food well and credit the body with enough intelligence—shall I say?—to tell you how much to eat and what. No animal, to my knowledge, has any table of the caloric values of foods, nor of its own caloric requirements, nor needs any. Yet it must be admitted that animals untainted by contact with man and his civilized eating customs have remarkably little need for the services of a physician. It would seem that man should do at least as well. However, man has worked wonders in the increased production of milk and eggs by scientifically feeding his cattle and hens—even if we allow for a large measure of this increased productivity's being due to scientific breeding and good care generally. And yet, in spite of this increased productivity, it is very doubtful if the cows and hens so (scientifically) fed are as healthy and hardy as cattle and chickens that are allowed to follow their own natural inclinations in the choice of food, as well

as the amount of it eaten. Of course, it is true that man lives under unnatural conditions and possibly for that reason can't be depended upon to have a natural appetite that will tell him how to eat right instinctively but I still maintain that if man ate only when hungry, chewed his food properly, and made his diet consist of simple foods, simply prepared, he would be able to maintain a very high degree of physical health without worrying about tables of caloric values. And anyway, there is considerable variance of opinion among experts as to how many calories a man actually needs per day, and still a greater variance between what he theoretically needs and what he can actually live on. The European war has totally upset many fine theories regarding the least that will sustain life. The populace of some of the belligerent countries have been forced to live on amounts of food that make the theoretic minimum caloric allowance of some experts look like a lavish banquet.

And finally, the amount of fuel required by anyone is dependent upon three circumstances, different for almost every individual, to-wit: Age, activity, and temperature of environment. Other things being equal, those who have not attained full growth will need most food, infants and those who have passed the zenith of life less, the least being needed by the very young and the very old. Likewise, other conditions being the same, the most active will need the most food. And similarly, those exposed to the most cold and the most inclement weather will, other factors discounted, require the most food.

These three conditions, then, determine the amount of food needed. A normal appetite can best tell what to eat, when to eat, and how much to eat. Of course, for the sick it is all right for a doctor to prescribe the exact number of calories of each kind of food, particularly in sanitariums and hospitals, but for the average person a normal appetite is by far the most

practical guide. With this one may trust the body's physiological elasticity to adjust itself within reasonable bounds, to the amount eaten. A little more than is actually needed may thus be taken at times, but such slight excesses will be safely taken care of by the healthy human body as they are taken care of by the body of any other healthy animal. However, the general tendency with all kinds of food should be to eat the minimum that will sustain a good weight and energy, rather than the maximum that the body can dispose of. If you follow this plan there will be little danger of intestinal putrefaction, fermentation and the general clogging of the body with waste that are so common among people who overeat. If you maintain a normal weight, feel well, are normally hungry when you should be, have no unnatural craving as to kind and amount of food, and do not suffer from bad breath, disagreeable taste in the mouth, particularly on arising, and have a clear skin and a clear eye; if, in other words, you show none of the symptoms of a system clogged with food waste, you are not eating too much or too little.

One more admonition and we will close this subject: It is hardly necessary to pay any conscious attention to the selection of foods for protein except to see that you do not get too much of it, for too much protein can work more hardship upon the system than too much of any other kind of food. Besides there is hardly a food but what contains some protein, so almost any dietary would not be totally lacking in that food element, and most dietaries contain far too much. To quote Bayliss, a world renowned physiologist, "Take care of the calories, and the protein will take care of itself." However, he was careful to admonish his readers that they must guard against the evils of a one-sided diet by eating also what we class as the "succulent foods." He meant not so much to emphasize the importance of the calories as the fact

that one needed to pay no conscious attention to the selection of foods for their protein. Simply that almost any ordinary diet furnishing enough total fuel, with a liberal allowance of the succulent foods, would contain all the protein necessary for health.

However, for the information of those who are interested in knowing the exact amount of protein required by the average person for a day's supply of that substance, and who would like some ready and convenient way of determining what amount of protein foods would supply sufficient protein to satisfy that requirement, the following is given.

It must be evident to anyone that since protein is a tissue-builder, the greatest amount of it will be required at that time when tissue is being built most rapidly, namely, infancy. During no time in the life of a normal, healthy individual is tissue built more rapidly than during the first years of life. Therefore, since most tissue-builder is needed during infancy, the normal amount of protein furnished by the natural food of the infant human, its mother's milk, might serve as an index. We find that this most perfect of all foods for the rapidly growing infant contains from $7\frac{1}{2}$ per cent to $8\frac{1}{2}$ or 9 per cent protein. It would therefore seem quite reasonable to suppose that, if $7\frac{1}{2}$ per cent to 9 per cent of the day's food supply in the form of protein is sufficient to meet all demands at the time of the body's greatest need of protein, a similar percentage of the day's food supply in the form of protein should be sufficient to meet all subsequent normal needs of the body. Persons recovering from wasting diseases, such as typhoid fever, etc., can utilize more protein than is normally required by a healthy individual.

Making allowance for the greater digestibility of the protein in mother's milk than the protein of other foods, it has been deemed advisable to increase the

percentage allowance to meet imperfections of digestion and assimilation, and 10 per cent has been decided upon as a suitable percentage of the total caloric value of the day's rations that should be taken in the form of protein. That is, 10 per cent of the total food units in the form of protein is a sufficient percentage for a man either resting or sedentarily employed. But for the same man actively employed at muscular labor 10 per cent would be too much. The reason for this is that, while a man's fuel requirements increase or decrease with his activity and the temperature of his environment, his actual need for protein does not vary. It is practically the same regardless of how much or how little work he is doing—provided only that he get sufficient fats and carbohydrates to make up his total fuel requirement, and succulent foods enough to supply all necessary mineral salts. Hence, while a man at hard muscular work needs a greater amount of food than the same man at rest, that increased need should be met, not by an increase in the protein foods, but by an increase in the carbohydrates and fats.

Take, for example, a man at moderate muscular work with a total fuel requirement of 2000 calories daily. Then, if 10 per cent of this be in the form of protein, or 200 calories of protein, since 4 calories are furnished by each gram of protein, such a man will need to consume 50 grams of pure protein. Or, $50 \times 4 = 200$, equals 10 per cent of 2000. Now if this same man should be put at work demanding an extra thousand calories, or 3000 calories daily, his protein need would still remain 50 grams or 200 calories of protein per day. But 200 calories is not 10 per cent of 3000 calories, but only 6 2-3 per cent. Thus, while the actual amount of protein needed by a man is practically the same whether at hard work or at rest, the relative amount (in proportion to the total food requirement) is less when the man works hard than when he rests. Mathematically, 200 calories is less in

proportion to 3000 calories than 200 calories in proportion to 2000 calories.

But the fifty gram allowance means fifty grams of pure protein, and, since no food is pure protein, we must estimate the actual amount of protein from the percentage of protein found in the foods according to the figures, say in bulletin No. 28. If a food is 25 per cent protein, then to get fifty grams of protein, one must eat 200 grams of that food. For instance, according to bulletin 28, full cream cheese is about 25 per cent protein; then in each gram there is $\frac{1}{4}$ gram protein, and to get fifty grams of protein would require 50×4 or 200 grams of the cheese. Since it requires approximately $28\frac{1}{4}$ grams to make an ounce, this would mean about 7 ounces of cream cheese to make up a complete day's supply of protein, that is, if no other protein were eaten. But, as said before, almost every food contains at least some protein, so considerably less than 7 ounces of cheese along with one's other foods would be required to furnish sufficient protein.

By applying this method of calculation to any other food whose percentage of protein you know, or can learn from the bulletin mentioned, you can easily arrive at how much of the food under consideration would be needed, or, if you want to go to the trouble, you can calculate the number of grams of protein furnished by each article that you eat, and from that estimate the total daily consumption of protein. That is, you can do that—if you have time. Personally, in view of the smallness of our actual protein need, and the fact that almost all foods contain some protein, I would rather content myself with avoiding an excess of the rich proteins, allowing my normal appetite to choose the kinds and amounts of foods eaten and use my time in other things than rather useless calculation of total protein intake.

Regarding the rule against combining milk and acid or sub-acid fruits, there is simply this to say in

explanation: This may prove a bad combination, not because the fruit sours the milk, as some have said—for all milk is soured by the stomach, anyway, in the natural course of digestion—but because it may, in addition to the hydrochloric already normally present, cause it to sour too much, that is, form too hard a curd. This is particularly true in the case of one with “acid-stomach.” When milk is taken into the stomach it curdles on coming into contact with the gastric juice; the solid part, or curd forms into a mass, while the watery part with its mineral salts and soluble albumin is eventually passed on into the intestines and digested and absorbed. The curd is attacked by the digestive enzyme, pepsin, whose function is to digest, at least in part, all proteins. But when, thru the presence of too much acid, as is liable to be the case when acid fruits are eaten at the same time with the milk, the milk is curdled too hard, it is likely to form a very compact leathery mass quite impervious to the pepsin and hence very hard to digest, if digested at all. Very often in such a case it is vomited up in tough, leathery clots.

As for the rule against drinking milk with a meal containing concentrated proteins, particularly meat and fish, the chief reason for this is that you don’t need more protein, even the amount contained in a glass of milk. Another reason is that milk, by virtue of its soothing effect upon the taste buds, may lead one to keep on eating when one has already had enough.

Eating starches and sugars at the same meal, as in eating sugar on your mush, or eating a rich sweet dessert after a meal containing a liberal amount of starch, is objectionable because it is combining two concentrated foods at the same meal, already quite fully discussed.

The admonition not to eat too many articles of food at one meal, and by the way, I consider more than five, or six articles of food too many for one meal—is based upon the facts that, first, by virtue of the pleasing

effect that so much variety has on the taste buds and the appetite, as well as because one will always try to eat at least some of everything on the table, it leads to overeating. And, second, due to having so many things and wanting to try them all before the taste buds tire and the appetite palls, it leads to eating too fast. In fact, one of the greatest hindrances to proper mastication is not only having too much to eat, but trying to eat too many different things. Strictly limit yourself as to the variety and quantity of food that you allow yourself at each sitting and you will soon find that you will be masticating what you do eat much more thoroly.

The rules not to eat pepper and other spices, ketchup and other condiments, and sour pickles, or things pickled in vinegar and spices are based upon the fact that such things are not only indigestible, but irritating to the alimentary canal and stimulating to the appetite, thus not only causing digestive disturbances, but leading to overindulgence in food.

Salt, in more than very moderate quantity, is also irritating and tends to stimulate the appetite. Besides, too much is unnecessary and only makes the eliminative organs do that much more work in getting rid of it. It is one of the most frequent contributing causes in such nasal mucous inflammations as colds and catarrh. Salt, dissolved in water is fine, used as a nasal douche for either of these conditions, but salt should be used very moderately indeed internally in such conditions.

To complete our knowledge of gastric digestion, let us learn that the stomach also secretes an enzyme that digests fats to a certain extent. The fat digesting enzyme of the stomach works principally on emulsified fats, such as cream, and to but a very limited degree on other fats. In any event, while some fat is undoubtedly digested in the stomach, gastric digestion of fat plays no very important part in the body's economy;

one could still live very healthily if it did not take place at all. Digestion of fats is carried on principally in the small intestines.

But before we leave the consideration of gastric digestion it might be interesting to note a fact or two regarding the relative speed with which fats, carbohydrates, and proteins leave the stomach. When eaten alone, starches pass from the stomach most quickly, proteins second most quickly, and fats slowest of all. The reasons for this are: First, that since starches are not digested by the gastric juice and have no chemical affinity for the hydrochloric acid, they are very soon saturated with it or contain free hydrochloric acid, and, since the speed with which a food passes from the stomach into the intestine is largely determined by the quickness with which it becomes saturated to excess with the hydrochloric acid, starches are very soon passed onward from the stomach; Second, proteins, on the other hand are acted upon by the gastric juice and do have a chemical affinity for the hydrochloric acid, so that some of this acid combines with the proteins, thus taking a longer time before there is any excess, or "free," hydrochloric acid present to cause the pyloric valve to open and allow the food to pass into the intestine; in other words, in protein digestion there must be enough acid secreted first to combine chemically with the protein and then some in addition more than will combine with the protein before it can pass from the stomach; Third, fat in the stomach has a tendency to retard the hydrochloric acid secretion, and, since, the fat also must be saturated with the acid before the pylorus will allow it to pass on, it remains in the stomach quite a long time, longer, in fact, than either starches or proteins. Mixing starches and proteins tends to raise the time required for either to pass onward; and mixing fats with either greatly retards their passage, causing a greater delay in the case of fat and protein than in the case of fat

and starch. This, by the way, should serve as a valuable "tip" to those who suffer from too rapid stomach digestion, that is, a too rapid emptying of the stomach contents into the small intestine. For such a procedure cannot be called too rapid stomach digestion, as there is but very little digestion about it. Try eating a little fat, preferably cream, if your food tends to pass from the stomach too quickly. This will slow up the secretion of the acid and give the food a chance to undergo proper stomach digestion. However, too much fat should not be eaten, as this might lead to vomiting and thus defeat its own ends. And under no consideration should such a person eat fried fats; these are exceedingly irritating and would only aggravate the trouble. Bad as fried fats are even under the best of conditions, they are far worse in cases of hyperacidity, "acid stomach."

Sugar and sweets in general especially when taken to excess, will also stimulate an excessive flow of hydrochloric acid. Commercial, or cane sugar when eaten immoderately is especially liable to do this; because so concentrated and carrying no bulky, indigestible residue and no water, it is a great irritant. To demonstrate its irritating qualities you have but to hold a piece of it in the mouth next the cheek until it dissolves and then note the furry, unnatural feeling it leaves on the mucous lining. Its effect is equally marked on the stomach lining, and the increase in the flow of the gastric juice thus stimulated corresponds with the increased flow of saliva produced by it in the mouth. Therefore, people suffering from "acid stomach" will do well to avoid cane sugar and other concentrated sweets almost entirely, eating very moderately of even the dried sweet fruits, or eating them in combination with some bulky succulent food.

CHAPTER X.**Intestinal Digestion.**

When food which has had proper mouth treatment and proper gastric digestion reaches the intestines, it is set upon by a number of different digestive agents and the starch digestion that was begun by the saliva and the fat and protein digestion left unfinished by the stomach are completed. The sugars, which are hardly affected by either the saliva or the gastric juice, are also digested and absorbed by the small intestines. In fact most of the digestion and practically all the absorption of food takes place here in the small intestines. So largely is this so that people can and do live without stomachs, tho of course this places an extra burden upon the intestines. Naturally, with a good mouth and stomach digestion, there is far less work imposed upon the intestines with the result that they do their work much better and probably are able to work for a greater number of years than when the stomach is missing, or mouth digestion incomplete, or both.

On a previous page, in dealing with the stomach's method of emptying itself of food, we saw that when the food had been so thoroly acidified that there was some free hydrochloric acid, this acid caused the pyloric valve to open up and allow some of the food to be literally squirted by the force of the muscular contractions behind it into the first part of the small intestine. Now the normal state of the small intestines is alkaline, not acid, and when this acidified food is ejected from the stomach into the intestines, the presence of the acid causes the pylorus to contract again thus shutting out any further food until that which has already come into the intestines has been first neutralized and then made alkaline. By this time more food on the stomach side of the pyloric valve has become acidified,

so that the valve can again open up and some more food be squirted into the intestine, when the valve again closes in response to the acid stimulus. This process is repeated until the entire meal has passed into the intestine, tho toward the end of the process the valve may open up and let thru even fair sized pieces of food that have not been thoroly acidified. Especially is this likely to be true in the case of a big meal, and more especially still if the food has not been chewed properly. One of the worst features of this is that these lumps of food that have not been thoroly subjected to the germicidal and vermicidal, or parasite-killing, action of the hydrochloric acid may carry injurious parasites, either in the form of germs or in the form of worms or their larvae or eggs (as tape-worm) into the small intesines. Particularly might this occur with meats, and still more particularly with underdone or raw meats.

Now it so happens that since most of the digestible nutrients of food are digested and absorbed in the small intestine, that part of the digestive tract is very likely to find itself without sufficient undigestible residue, or bulk, to carry on its normal work without sufficient bulk to give it the necessary muscular work to keep it healthy and functioning normally, and this is even more true of the large intestine or bowel. To keep the intestinal muscles healthy and performing their peristaltic motions (as their muscular activities are called), it is imperative that they have sufficient bulky, fibrous food to furnish enough mechanical irritation to the intestines to bring on muscular contractions and to furnish a certain amount of resistance to the muscular contractions. Hence, the vital importance of the succulent foods. Another thing about the intestines is their rapid absorption of all moisture from the food, this being particularly true of the large intestine. This has a tendency to cause the waste to dry hard and either accumulate in hard

masses, or stick to the lining, either case causing unnecessary irritation and perhaps eventually establishing a catarrhal or other pathological condition. It is almost sure to cause a very aggravated form of constipation or its opposite extreme, catarrhal or mucous diarrhea. Eating plenty of succulent foods will entirely obviate this, for the indigestible portion of the succulent food will carry enough water (which is not given up because the fiber is not digested) to maintain the proper degree of moisture, and, besides, such food acts as sort of an intestinal broom, sweeping the waste and impurities before it. Of the virtues of its contents of mineral salts in this connection we have already spoken. Another virtue of the bulky foods in this connection is that if fermentation sets in, it can go only so far before the fermentation of the fiber, or cellulose, produces acids that not only check the process of fermentation and destroy the fermentative bacteria, but also check the action of and destroy the putrefactive bacteria, which attack proteins, as well. This is of tremendous importance to those suffering from intestinal fermentation and putrefaction and their attendant sluggishness and arterio-sclerosis, respectively, as well as other diseases springing directly from fermentation and putrefaction. And now, a word about these processes.

CHAPTER XI.

Fermentation and Putrefaction.

In the chapter "Regarding Acid" and "Alkaline Foods" a fuller discussion of the acids produced in abnormal digestion and assimilation, in fermentation and putrefaction, was promised; we will now turn our attention to that matter.

If carbohydrates be eaten to excess, or eaten without hunger, or not thoroly chewed and insalivated, or eaten in improper combinations, they are almost sure to ferment with the formation of acids (some of which are harmful and all of which are irritating to the lining of the stomach and intestines) and, according to some authorities, alcohol in greater or less quantities. To quote Martin H. Fischer's "Physiology of Alimentation:" "No inconsiderable amount of acid seems to be derived from the carbohydrates through the action upon them of the bacteria found in the small intestine. Among the acids formed in this way in small amounts under normal conditions. and in often enormous amounts in pathological states may be mentioned acetic, different kinds of lactic, succinic, butyric, and formic acids. The excessive formation of these acids is at once brought about when from any cause—such as insufficiency of the secretions of the alimentary tract, or insufficiency of the proper ferments (normal digestive enzymes) in these secretions, or enjoyment of excessive amounts of carbohydrates—these are not digested and absorbed in the proper way and so become the prey of the bacteria always present here." He further tells us that: "The organic acids produced bring about, even in small amounts, an increased peristalsis and an increased secretion of water into the intestine, so that if the condition is at all marked, frequent liquid stools, acid in reaction and ill-smelling, result." He also points out that while small amounts

of these acids may be absorbed, oxidized in the tissues, and no evil consequence result, yet 'acute' alimentary fermentations (with diarrhea and the general symptoms of intoxication)" are likely to follow excessive amounts of sugar and candy, much more likely to follow the excessive use of these than they are to follow the use of similar quantities of starch. Let me add that in my own experience I have found that a great many people eat excessively of both starches and sugars, and this sometimes at one and the same meal, as for instance when they eat mush for breakfast and load it down with sugar. The mush alone is a crime against the digestive organs and against the teeth, but adding sugar to it is still worse. But I shall not waste space condemning the addition of sugar to the mush; mush isn't fit to eat, anyhow, and that for two very good reasons. First, being starch, it needs thoro mastication and insalivation, but, being soft and pappy, too soft and pappy to render chewing necessary or even possible, it is gulped down with no chance for the saliva to act upon it. Second, even if it were chewed it could absorb but very little saliva for the simple reason that it is already saturated with water in which it has been cooked and the milk or cream that has been served on it, and so is not capable of absorbing a great deal of saliva. Don't insult your digestive organs with mushes of any kind!

Fats, too, under abnormal conditions of digestion and assimilation, break down into acid products, some of them being very much in evidence in diabetes. Fried fats are particularly likely to undergo a form of abnormal decomposition in the stomach and intestines with the formation of very irritating acids. Fats should be eaten by most people, except the inhabitants of the frigid zones, in moderation

But if carbohydrates and fats break down, under abnormal conditions, into acids "all of which are more or less irritating and some of which may be highly

injurious," what may be said of the products of abnormal protein decomposition? Let us see what Professor P. G. Stiles, of Harvard University, has to say about it.

"It may be said that protein far more than the non-nitrogenous foods is capable of generating toxic substances and so of becoming a true cause of auto-intoxication." Practically all nutritional authorities agree in this matter. And all agree that some proteins are much more liable to cause the formation of toxic, or poisonous, substances than are others. Meat and animal proteins in general, except milk, are much more likely to undergo putrefaction with the formation of poisonous acids than the vegetable proteins.

Among the acids produced by the putrefaction of proteins within the intestine may be mentioned two with the not very pleasantly suggestive names: cadaverin and putrescin. Then, there is one, tyramine, which seems to have its specific action the raising of the blood-pressure, and Underhill tells us it not only arises from intestinal putrefaction but is also found in some of the rich protein foods, for example, "in such varieties of cheeses as Camembert, Roquefort, Emmen-thal and even the American cheddar cheese." It is also quite naturally to be expected in tainted meats, "high" poultry and game, and in all flesh foods which have already begun to decompose. And even when no putrefaction is present to produce the acid already named, there is still the production of uric acid in the blood. Some of this uric acid is a normal product and can't be escaped, but when more protein is eaten and absorbed than the tissues need for growth and repair, more uric acid is often formed than the body can eliminate, thus causing gout, rheumatism, etc. This is particularly true of meat proteins, for in addition to the natural amount of uric acid that would arise from the use within the body of any kind of protein, there is bound to be more or less of the uric acid

that was in the tissues of the animal furnishing the meat at the time it was killed. And this can only be eliminated at a good deal of expense to the eliminating organs, particularly the kidneys. Before concluding our remarks on uric acid let us once more quote Professor Stiles: "Another compound which has attracted much attention on account of its apparent relation to several pathologic conditions is uric acid. A certain amount of this is produced during fasting and is not increased by the taking of many kinds of food. The addition to the diet of meats leads to a larger formation of uric acid. A maximum quantity is elaborated when glandular tissues, such as liver, kidneys, and sweetbreads, are eaten. The chief peculiarity of uric acid is its slight solubility, which renders its complete excretion difficult and uncertain. Retention of this crystalline substance has been held accountable for the painful symptoms of gout and of a good deal that goes by the inclusive name of rheumatism."

And in addition to all the foregoing anent protein overconsumption in general and meat overconsumption in particular, there sometimes results from the eating of large quantities of meat and sugar a type of fermentation in which oxalic acid is produced and which must therefore be highly injurious, according to Sherman.

Plainly, then, the wise thing is to be moderate in the use of all foods, particularly the proteins, and more particularly still the flesh foods.

CHAPTER XII.

Effect of the Emotions on Digestive Processes.

Since diet in its larger sense means nutrition and since the emotions may very powerfully affect the nutrition, either for good or for ill, it falls within the proper purview of this book to discuss the emotions and their effects upon nutrition. In fact no thorough book on dietetics would be complete without such a discussion. Fortunately here again we are not left to guess-work and popular illusions; for this field has been pretty thoroly worked of recent years by men of science and the established truths of the matter set down in very readable form in the authoritative literature of the subject. Briefly, the more important conclusions from our point of view follow.

Everyone knows that the "mouth waters," that is, the saliva flows, at the smell, sight, or even thot of good things to eat; and investigators many years ago proved that "the mere sight or smell of a favorite food may start the pouring out of gastric juice." But no such response occurs when the food is not of a pleasing kind or appetizingly presented. And this fact, that the secretions were stimulated only by appetite, led Pawlow to call such secretions "psychic secretions" or "psychic juice."

Similarly, Cannon tells us that, just as there are "psychic secretions," so also is there a "psychic tone," or "psychic contraction," of the muscles of the alimentary tract as a result of taking food. For he has demonstrated that if the "nerve supply to the stomach is cut immediately **before** an animal takes food, the usual contractions of the gastric wall, as seen by the Roentgen rays, do not occur; but if these nerves are cut **after** food has been eaten with relish, the contractions which have started continue without cessation."

Just as appetite and the pleasure of its gratification induce a fine flow of digestive juices and start the muscular activities of the digestive organs, so great excitement can stop both the flow of juice and the muscular activities that have been started. Most everybody is familiar with the utter lack of saliva when some strong excitement affects the mind; one can be in the midst of a most sumptuous meal with the keenest of appetites and a strong flow of digestive juices and yet have the whole business suddenly turn flat upon the receipt of bad news, or the rousing of anger, or some kindred emotion. Even becoming deeply engrossed in some business transaction, or reading some disagreeable piece of news in a paper, or recalling some unpleasant memory, may stop the flow of saliva and other digestive juices right in the midst of an otherwise pleasing meal, and cause the food eaten to lie in the digestive tract for hours unacted upon by either the juices or the muscles of digestion. To quote Cannon again: "The conditions favorable to proper digestion are wholly abolished when unpleasant feelings, such as vexation and worry and anxiety, or great emotions such as anger and fear, are allowed to prevail." And again: "The influences unfavorable to digestion are stronger than those which promote it. And," he adds, "evidently, if the digestive process, because of emotional disturbance, is for some time inhibited, the swallowing of food which must lie stagnant in the stomach is a most irrational procedure. MacBeth's advice that 'good digestion wait on appetite and health on both,' is now well-founded physiology."

From this it should be plain to even the most casual reader that mealtime of all times should be the pleasantest. There should be no meal eaten without a cheerful and optimistic frame of mind; thots and conversation should be of a pleasing turn. All care, worry, grief, fear, anger, and similar feelings should be scrupulously avoided at meal time. Even that "hurried

feeling" should be avoided when eating. Nor, above all things, should a child ever be scolded during or shortly after a meal.

And now a word of advice to those people whose brains are tyrants over the rest of their bodies, even their stomachs. If you have been able to banish your mental problems long enough to taste what you have eaten and to enjoy it, be wise enough to allow the digestive organs their fair share of the circulation for the first half hour or hour after eating so that the products of digestion may be absorbed and carried away from the congested digestive organs and to other parts of the body where nutriment is needed. Don't sit down immediately after a meal, especially a heavy one, and start using your brains just as tho they had all the blood in the body at their disposal; they haven't, and heavy mental work after a good meal is either going to interfere with the proper digestion and absorption of the food, or the mental work will be of inferior quality, or both. Remember that an active stomach requires plenty of blood and nervous energy and an active brain requires the same, so don't interfere with the best work of either by trying to make both work at once.

And another thing—quit spying on your organs. Eat what you know you should, chew it properly, and cultivate the proper frame of mind, and otherwise create favorable conditions for the normal action of the organs—and then quit suspecting them of not performing properly. You can work upon your digestive apparatus by autosuggestion to such a degree as to cause indigestion and constipation. **DON'T DO IT!**

CHAPTER XIII.

Concluding Remarks on Digestive Processes.

We have now learned considerable about the activities of the digestive organs, about their chemistry, about their muscular action, and about the way they are affected by the foods we eat, the emotions we feel, and even the thots we think. And that is about as much as we need to learn in a work of this kind. To follow to further lengths the processes of digestion would be to burden the mind needlessly with the details of the physiology and chemistry of digestion having no relation to the practical application of the science of dietetics so far as the reader is concerned. And since our purpose was to give merely enough of the chemistry and physiology of digestion to show the reader the grounds upon which the rules are based and not to go into the minutiae of the digestive processes, we will not follow this discussion further. Suffice it to say that if the rules laid down in this volume are faithfully adhered to you will be unconcious of ever having a stomach or intestines, and as for constipation and other bowel troubles, they will be out of the question—apart from injury. Of course, there is nervous constipation as there is nervous diarrhea, for instance among students about to take an examination, or others facing critical situations and for the time being under unusually high nervous strain, even as there are nervous headaches which are truly nervous in their origin. But I am firmly convinced that even these may be traced in large part to a previously wrong diet and if people so afflicted will but follow a rational diet and rational methods of living in general they will be rarely so afflicted. Also, there is "habit constipation," met with in school children who are sometimes restrained from attending to the evacuation of their bowels when necessary, resulting in a sort of tolerance

on the part of the bowel of fecal matter that should be ejected and ordinarily would not be tolerated. Others who cannot, or will not attend to the evacuation of the bowels when necessary and who persist in such a course are almost sure to establish habit constipation.

The body can be made to establish and tolerate many pernicious habits among which this is one of the most disgusting and damaging. No matter what the circumstances, try always to void the fecal matter as soon as possible after the impulse to do so is felt. In case you have to wait until the impulse is lost before getting a chance and the impulse does not return within four to six hours of ordinary activity, take a short enema—half a pint or a pint—to start the movement. Under no circumstances let such a condition go over night; to take a short enema is the work of but a few minutes and the superiority of the sleep following it will amply repay for the time and trouble. One should be willing to take any amount of trouble to ward off this baneful complaint.

Another factor that may cause it apart from wrong diet is bad posture, particularly in sitting. Never allow yourself to sit on the middle of your back. Sit erect upon the buttocks and as much of the thighs as can conveniently be made to support your weight on the object upon which you may be sitting. Neglect of proper posture together with lack of exercise will, if not actually cause constipation, at least hasten its development and lengthen its stay.

While this is a book on diet, not on exercise, yet I mention these things so that you will be able to credit them with their fair share of the blame in case you are troubled with constipation and particularly if it does not seem to yield to the diet treatment as readily as you expect. By the way, in some instances where the dietetic treatment of constipation seems not to get the desired results the fault will be found to be that of not eating enough of the foods recommended

But where enough of the laxative foods are eaten and properly chewed, and where this is combined with due attention to exercise and posture and the habit of attending to the bowels regularly and promptly, constipation will be cured in almost every instance.

CHAPTER XIV.

Air and Water—Their Place in Nutrition.

Tho not commonly thot of as foods, these two substances play such vital parts in nutrition that we must mention them in passing, if only to emphasize their great importance. It may seem strange that the virtues of anything of such vital moment to the body's well-being should need to be emphasized, but the fact remains that the vast majority do not breathe all the good pure air they could use, nor drink enough good plain water.

AIR. To be sure, most people breathe enough air to support the vital processes in a way, but there is a vast difference between just breathing enough "to get by on" and breathing such an abundance as to feel constantly the healthy stimulation that comes from having the blood well aerated, the wastes burned up, and the circulation bounding thru the body. Most of the sub-normal temperature so frequently found in women is due to deficient oxidation caused by shallow breathing. And tho air cannot be said to be a food in the strictest sense of the term, because it neither builds tissues nor yields energy, yet one renowned nutrition authority so calls it. He says: "If there is a lack in this most important food-substance (and nothing else can take its place), starvation as truly results as if other food were withheld, for the changes required for nutrition cannot take place, and furthermore incomplete decomposition

occurs, which may result in more or less poisonous products.

“Fresh air—air with its quota of oxygen—is, then, a prime requirement in nutrition.”

WATER. Most people drink some water daily, but there is a great difference between just enough to keep from dying of thirst and drinking enough to keep the body always washed thoroly clean of all water-soluble impurities. Certainly a big percentage of constipation and other disease of faulty elimination is due, at least in large part, to insufficient water drinking. And not only is it very necessary in plentiful quantities to proper elimination, but it helps to regulate many other body processes, besides forming 60 per cent of the body weight of the average man.

When considerable quantities of it are taken at meals it tends to cause better absorption and assimilation of food. A hint to skinny persons—and fat! However, water must never be drunk to wash the food down; first chew your food so thoroly that it passes on as a liquid—and then water, if you wish.

The amount of water needed varies with different individuals and with the same individual at different times and under different circumstances, but it should hardly fall below eight glasses per day in normal people.

Drinking water should be neither excessively hot nor ice cold, and in any event it should not be poured down, but drunk slowly to allow the mouth to bring it to nearly body temperature before it reaches the stomach, thus preventing shock to that organ. This is of considerable importance at meals and with the sick. Anyway, if you are drinking it for either its heating effects or its cooling effects, you will derive just as much heat or be cooled just as much by its slow passage thru the mouth as if gulped down to burn or chill the stomach. Many people, particularly those

with "Hyperacidity," don't drink enough water. There is no sense in swilling down more than you need but the general tendency is rather in the opposite direction. Remember! 8 glasses daily is the minimum!

CHAPTER XV.

The "Vitamins."

Of these recently discovered essentials of nutrition, the so-called "vitamins," but two have thus far been isolated—fat-soluble A and water-soluble B. Aside from the fact that, while but one is soluble in fat, both are soluble in water—hence their respective names, very little is yet known of their chemical nature, tho their functions in nutrition have been closely studied and many of the foods in which either or both abound catalogued. Some investigators think there may be more than two "vitamins," tho no one has yet succeeded in isolating any other than those above named; however, no competent investigator encourages the belief in a multiplicity of "vitamins." And McCollum, perhaps the foremost investigator along these lines, thinks that the evidence in support of the theory of other "vitamins" is very meagre. The same authority objects on very good grounds to calling these unidentified food substances "vitamins;" in fact it was he who named them fat-soluble A and water-soluble B. Splitting the word into its two component parts, he says: " 'Vitamine' is objectionable, because the prefix **vita** connotes an importance of these dietary essentials greater than other equally indispensable constituents the diet. * * The ending **amine** has a definite and specific meaning. * * Any substance to be properly designated as amine must contain the elements of nitrogen. There is no evidence that either of these dietary essentials is an amine, and indeed fat-soluble

A probably contains no nitrogen, for it is especially abundant in butter fat, and the latter is practically free from this element."

In these objections to the term "vitamin," McCollum seems to be drawing the support of most of the nutrition experts, and, whatever may be the final outcome of the investigations as to the number of these chemically unidentified dietary essentials, there is very little room for doubt that the term "vitamins" must go by the board. For the present, since their respective solubilities in fat and water are all that we know definitely of their chemical natures, it will be the part of discrimination to call them fat-soluble A and water-soluble B, respectively. Later their chemical identities will most likely be determined, and then they will be properly named and classified according to their chemical natures.

For practical purposes we need interest ourselves here only in the results of a lack of these substances in the dietary and with a knowledge of the foods that supply an abundance of either or both of them. McCollum tells us that both of these substances are necessary in the promotion of growth and the preservation of health; without both of them the growing cease their growth and become diseased; the adult also becomes diseased from a lack of either or both. Beri beri, a disease the "most striking characteristic of which is a general paralysis," has been demonstrated to result from a lack of water-soluble B, while Xerophthalmia, an eye disease terminating in death, if unchecked, results from lack of fat-soluble A. And it seems reasonable to believe that if absence of these protective food bodies in marked degree will produce such well defined diseases as those just mentioned, their absence in a minor degree must certainly be productive of "much ill health of a less definite sort." So argue Fisher and Fisk in "How to Live," and, indeed, these two authorities take the position that McCollum's

evidence against a third "vitamin" which acts as a specific protective agent against scurvy is not conclusive. Admitting the evidence which he has brot forward to show that scurvy may be due to an improper diet and yet not to a specific "vitamin," they say: "The weight of evidence, however, still favors the view that in scurvy a specific "vitamin" is lacking, differing from either the fat-soluble A or water-soluble B "vitamin." These two authoratives also take the position that cooking injures or destroys these protective food substances. They say: "Some raw or uncooked foods, therefore, such as lettuce or tomatoes, celery, fruits, nuts, and milk, should be used in order to supply these minute and as yet not well-understood substances, some of which are apparently destroyed by the prolonged cooking at the temperature which is employed in order to sterilize canned foods or to dry vegetables. They are also diminished and often destroyed by the ordinary cooking, except in acid fruits and acid vegetables.

"It is true that only very clean milk is entirely safe in an absolutely raw state, and that heat is usually needed to kill the germs. But this heat, even at the comparatively low temperature of pasteurization, is thot by some to destroy the vitamins that prevent scurvy." And then they add the sage advice: "Orange juice should always be given to infants over one month old who are fed pasteurized milk." And again: "There can be no question as to the need for safeguarding infants fed on pasteuried or boiled milk by including orange juice in the diet after the first month."

Regarding the presence of fat-soluble A and water-soluble B in the usual foods, McCollum has demonstrated that the former is found in most liberal quantities in whole milk, cream, butter fat, egg yolks, and the glandular fats of animals—the liver, kidneys, pancreas, etc., and in the leafy vegetables. The tubers like potatoes, and the roots like carrots, and the bulbs like onions, as well as the seeds, wheat, corn, rye, rice,

peas, beans, lentils, etc., all contain in their natural state some of this indispensable fat-soluble substance, but in too small amounts to support normal growth and nutrition of animals unless liberally supplemented by the leaves of leafy vegetables or by milk and eggs and the glandular fats. Of these vegetable foods, the seeds are poorest of all in this dietary essential; the roots and tubers and bulbs, next; and the leafy vegetables richest of all. Thus it appears that those parts of a plant which act in the capacity of storage organs, storing food for the new plant that another new season will bring forth, are poorest in fat-soluble A, while those parts of the plant which act least in the capacity of storage organs are richest in this substance. And in this respect McCollum's observation that even among leaves those that act least as storage organs contain the most fat-soluble A, is interesting. He cites the thick leaves of the cabbage which act somewhat in the capacity of storage organs in contrast with some of the thinner leaved plants, such as spinach, the leaves of which do not act in a storage capacity. He points out that this is due to the fact that the first function of the leaf is to act as the laboratory of the rest of the plant, using the chemical rays of the sunlight to enable it to combine the elements of its surrounding air and soil into carbohydrate, protein and fat, and that when it is fulfilling this one function and not required to act as a storage organ also it contains none but active living cells. And these cells are the part of the plant containing by far the bulk of fat-soluble A. Hence, the vital importance of supplementing the usual diet of seeds, tubers and roots with a liberal allowance of the leafy tops of vegetables, or else milk and eggs. An interesting fact in this connection is that while fat-soluble A is found so plentifully in butter fat and egg yolk fats, it has not yet been found in appreciable quantities in any vegetable fat, such as olive oil, cotton seed oil, palm oil, peanut oil, etc., nor do ordinary body

fats of animals, such as lard or suet, contain it in quantities worthy of mention, it being found in appreciable amounts in the animal body only in the fats of the glandular organs already referred to. The yolk of the egg, being in reality the future young, and milk, being the natural food of the young, Nature has seen to it that these two foods are amply supplied with this very important fat-soluble substance. And because milk and eggs and leafy-topped vegetables are so abundantly supplied with this dietary essential, McCollum has termed them the "protective foods." The eating of one or more of the above mentioned "protective foods" is an absolute prerequisite of good health. And the wise plan would be to make sure of a plentiful supply of fat-soluble A by supplementing the usual diet by a liberal amount of leafy vegetables and milk, or leafy vegetables and eggs, or eggs and milk. Of these three, the first, leafy vegetables and milk, is in the author's opinion the best.

As to water-soluble B, it appears that if the diet is so arranged as to make sure of a sufficiency of fat-soluble A, there is likely to be no lack of the former. To quote McCollum once more: "If the diet is so planned as to furnish a suitable quota of milk and of cereals and other foods which are not so treated as to destroy the water-soluble B, there is no danger of a shortage of this substance in the diet." But foods can be so treated as to destroy this substance, and aside from prolonged cooking, nothing seems more destructive of this substance than the use of alkalis, such as baking soda or baking powder, in cooking. And while the housewife may be justified in the use of baking soda and baking powder in some of her cooking, she had best limit it, using it only where absolutely necessary. Many cooks have a tendency to use entirely too much of these compounds.

By way of conclusion, the present author knows of no better general summary of the entire question

of adequate nutrition than the following, taken from McCollum's book, "The Newer Knowledge of Nutrition:" "Liberal consumption of all of the essential constituents of a normal diet, prompt digestion and absorption and prompt evacuation of the undigested residue from the intestines before extensive absorption of products of bacterial decomposition of proteins can take place, are the optimum conditions for the maintenance of vigor and the characteristics of youth. Such a dietary regime can be attained only by supplementing the seed products, tubers, roots, and meat, with the protective foods, milk and the leafy vegetables."

FINIS.

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